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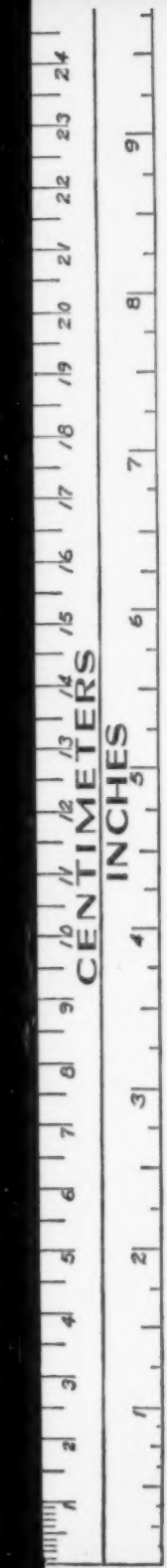

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AMERICAN ANTIQUITY

VOL. XX OCTOBER, 1954 No. 2

THE FIRST SHEGUIANDAH EXPEDITION, MANITOULIN ISLAND, ONTARIO

THOMAS E. LEE

ON A WOODED HILLTOP overlooking Sheguiandah Bay on Manitoulin Island is one of the most remarkable Indian sites ever discovered in Canada. It was found in the course of archaeological survey work in 1951 (Lee 1953). Extensive surface collections were made; the materials indicated that the site might be one of the earliest known in Ontario. Hundreds of large quartzite blades were obtained and their apparent connections were with the George Lake 1 site at Killarney, some twenty miles away on the mainland (Greenman 1943). The Sheguiandah site, vastly richer in material, gave promise of yielding valuable information about the nature and cultural connections of the people who had worked and perhaps lived there. Further, despite the fact that the site had thus far escaped the attentions of souvenir hunters and relic collectors, it was believed that any delay in investigations might subject it to the destructive forces which have fallen upon so many important prehistoric features. No protective legislation covering Indian sites existed in Ontario and it was deemed necessary to place a large crew on the site, in order to acquire as much information as possible in the first season. A large crew of volunteer workers, many of them members of the Ontario Archaeological Society, carried out excavations during July and August of 1952. William E. Taylor, graduate of the University of Toronto, was foreman. The geology of the site was checked by F. J. Alcock, Chief Curator of the National Museum of Canada, and later by John Sanford of Wayne University, Detroit.

As in the preceding year, a careful surface check was made to obtain as many specimens as possible for statistical analysis and comparisons with other sites. Finds were noted separately in terms of their occurrence in particular areas such as quarries and at various elevations on the sides of the hill. More detailed investigations were directed toward (1) possible geological dating of the site; (2) possible dating by radiocarbon analysis; (3) establishing a more extensive trait list; (4) determining whether the site involved quarry workshops alone, or workshops and village; (5) determining whether the artifacts found represented finished tools or merely quarry blanks and cache blades; (6) finding any animal or vegetal remains; (7) distinguishing any stratigraphy that might exist; and (8) obtaining all possible information from superposition. Methods and procedures changed as unexpected situations were met. Unexpected complexities developed and ever greater care was demanded.

EXCAVATIONS

Two positions were singled out for excavation, with different purposes in mind. One excavation aimed at obtaining any evidence of habitation, any very small flake tools that might be employed about a shelter, and any remains of bone, plant fibers, or charcoal. The other was conducted on a hillside dump in the hope that sufficient depth would be encountered to give some evidence of changing forms in unfinished blades and broken tools.

Although the site includes an area of 26 acres, only one relatively small section seems particularly suitable for Indian habitation. A nearly level piece of land occurs at the south side of the hilltop. It is well drained and remarkably well sheltered from winds. To the south and east, along the edge of the hilltop, is a curving ridge of quartzite boulders, about 8 feet high. To the north and west are several higher ridges of quartzite. Only 200 feet away is a small pond of water, seldom dry. It is choked with reeds now, but could have been a valuable and handy source of water for an Indian encampment. Quartzite was the material sought in making their stone implements; a fine-grained and nearly pure form of it is present in any quantity they might wish. Here,

if anywhere, would be found the traces of shelters, fires, and refuse pits. It was early recognized that a confused situation might exist, due to tree disturbances through the centuries. Surface indications and a few tests indicated that the upper level, at least, was composed very largely of quartzite chips, fragments, and blocks, with a generous sprinkling of blades or other artifacts throughout. The section is now in rather heavy second-growth bush.

In order to gain a clear picture of disturbances by previous forests, a unit of 10 feet square was chosen for excavation purposes. Five adjacent squares were laid out with reference to a base line and work was begun on all of them. Leaves and twigs were lightly raked away, exposing a dark humus-laden soil, littered with quartzite chips and a few artifacts. A large area to the west of the trenches was similarly cleared, to reduce danger of loss of specimens to tourists. Assemblages of artifacts and chip concentrations were noted and photographed in situ. Trowels, grapefruit knives, and paint brushes were employed to remove soil and debris in the squares. It was assumed that levels could be kept in the usual 6-inch divisions, but very quickly it became apparent that much valuable information would be lost, due to the amazing profusion of artifacts and chips. It was found desirable to obtain photographic records of the splendid assemblages in situ and it was seen that one assemblage lay directly upon another, with little soil separation. In consequence, the work of excavation was greatly slowed down and vertical positions of artifacts were noted to the half-inch, instead of by levels.

Work on square 7-1 was abandoned immediately after the surface was cleared, when the necessity for very slow procedures was recognized. Square 7-2 was not taken below 4 inches, but it will receive first attention in the following season. Squares 7-3, 7-4, and 7-5

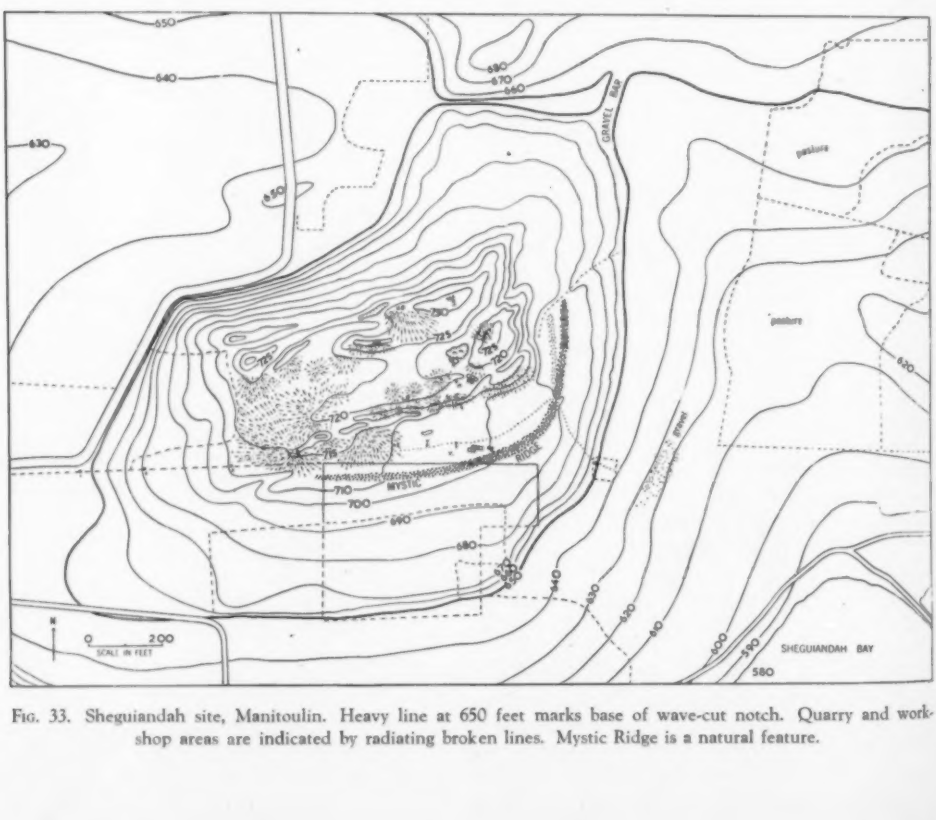


FIG. 33. Sheguiandah site, Manitoulin. Heavy line at 650 feet marks base of wave-cut notch. Quarry and workshop areas are indicated by radiating broken lines. Mystic Ridge is a natural feature.

were carried to depths of 13, 27, and 19 inches respectively. Also, a test hole was dug down an additional 4 feet in 7-4. (Full details of the excavations are reserved for a final report.)

It was thought that the big blades, scrapers, and hammers could not represent the entire nonperishable tool complex; each flake of quartzite was, therefore, subjected to close scrutiny and was tested by feeling the edges for signs of use, regardless of shape. Many small implements thus came to our attention.

A hitherto unsuspected component was soon discovered. Lying on or very near the surface were several flint flakes; a flint drill was found; a narrow blade of quartzite was chipped in a manner unlike anything noted here before; surface finds elsewhere on the site included another flint drill and the notched base of a quartzite projectile point. It seemed tempting to associate them with a small Point Peninsula site known to exist at the base of the hill.

The large quartzite blades, ranging up to more than 9 inches long, set in masses of chips and chunks of quartzite, continued to varying depths, due to uneven forest surfaces, but tended to end with the very dark soil at about 4 inches. It was noted that several concentrations of chips continued from the surface to the 4-inch level. In one place a curious pointed stone, suggestive of an anvil, was seen to have indications of battering along its corners. As excavations proceeded downward, concentrations of blades, chips, and one or two hammerstones around it left little doubt that it had been used as a convenient platform in chipping out the artifacts. Elsewhere, a few chips of greenish slate were found down to 4 inches, but only one piece showed any purposeful shaping. Several concentrations of charcoal fragments were observed and carefully saved. These may have resulted from the burning of roots below the surface during forest fires.

At 4 inches, small patches of buff-orange sand, clay, and gravel began to appear. The quantities of quartzite chips were much reduced. Between 5 and 6 inches were found 7 fragments of projectile points. When fitted together, 3 complete points were produced (see Fig. 35). The halves of one point had been separated a distance of 14 feet. All 3 showed heavy basal or lateral smoothing. Although one was notched, the general characteristics suggested a component much earlier than the supposed Point Peninsula found at or near the surface. While greater numbers of such points would be desirable to establish this hypothesis, the separation of halves in part answers the requirement; the depths of their occurrence were noted with sufficient care to lend weight to the belief that these are older than the big blades. In the first 6 inches, then, it would appear that at least 3 components are present and distinguishable.

Directly beneath the projectile points, to a depth of about 9 inches, occurring in the buff-orange sand, clay, and gravel, were found large quartzite blades, which differ in many respects from those of the upper level. They are much thinner, smaller, are more pointed, and have secondary chipping along the edges, causing them to be nearly straight edged rather than wavy. They are far fewer in number and are not set in masses of chips, although chips are not scarce. Here again is the suggestion of another and older component. A few similar blades were noted on the surface, however, and while we believe that they arrived there through the action of tree roots turning them out, conclusive proof was seldom obtained. In a few cases, doubt was removed by their occurrence in low mounds of buff-orange subsoil, some of it adhering to the rough surfaces of the blades.

Scattered throughout the fine sands and gravels to the 9-inch level were tiny fragments of charcoal. These were painstakingly gathered, although there was no hope of gaining any amount approaching that needed for dating. At this point the question of the origin of the soils and gravels containing human traces began to take shape. No suggestion of an old soil horizon could be seen, nor were the chips and artifacts distributed in any uniform way to indicate an old surface.

With the cultural material rapidly thinning out at 9 inches, emphasis was placed upon completing one square, 7-4, in order to quickly

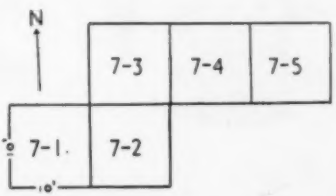


FIG. 34. Trench plan of Station 7.

grasp the full problem. The sands and gravels became coarser with increasing depth, while numerous boulders up to a foot in diameter appeared more frequently. Quartzite flakes continued throughout the material, many of them bearing bulbs of percussion or other evidence that left no doubt that they were products of man's activities. Artifacts were not present, except in the south half of the square. The north half was abandoned at 14 inches depth.

In the south half of 7-4, it was found that chips and blades continued to 27 inches, sometimes occurring in concentrations. Careful search for any trace of pit outlines either on the trench floor or on the profiles produced nothing. Only a few artifacts were found, unfortunately, but these were in every case the big blades of the upper level. One particularly interesting nest of charcoal was found, from 16 to 25 inches, in an irregular patch about 6 inches in diameter. It was sealed off under

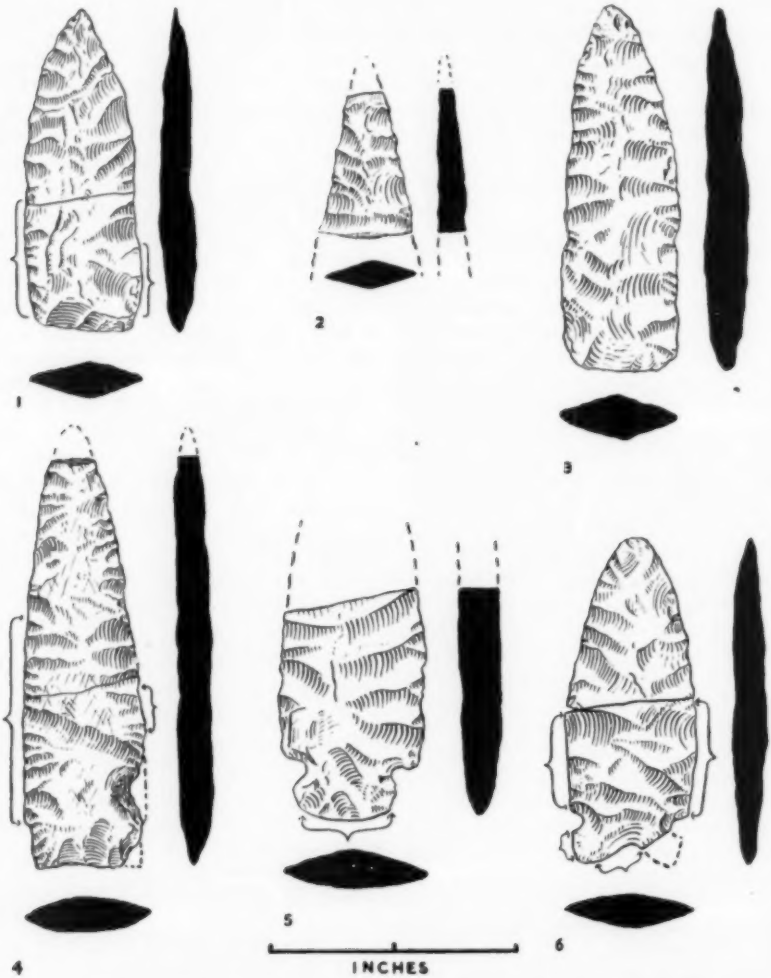


FIG. 35. Sheguiandah quartzite projectile points. Heavy basal and lateral smoothing are indicated by brackets.

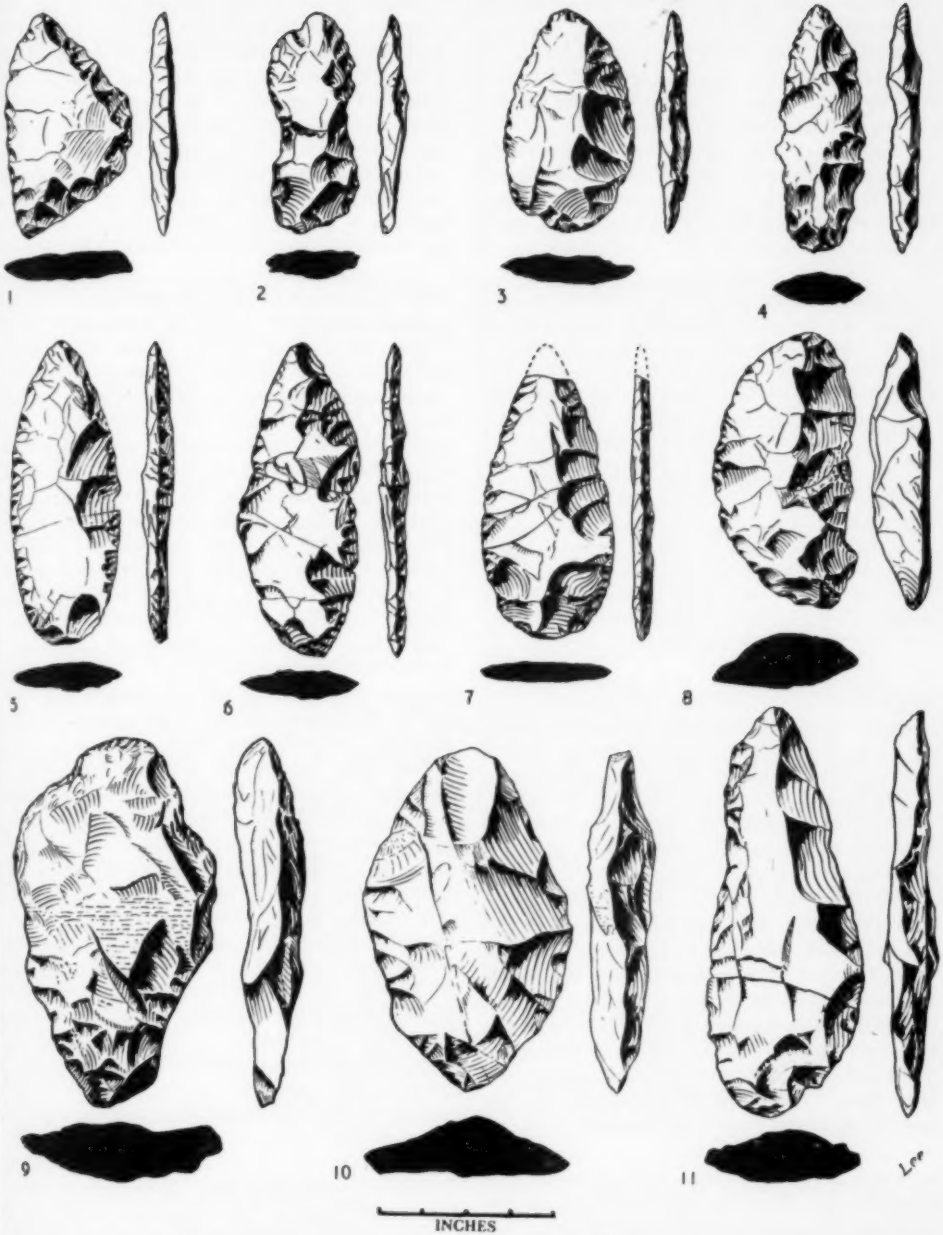


FIG. 36. Sheguiandah artifacts: 1) scraper, edge worn; 2) scraping tool (?); 3-6) blades; 7) blade, edge slightly worn; 8) semilunar scraper, edge worn; 9) end scraper, end worn; 10) rough quarry form; 11) semilunar blade from Giant site.

sands and gravels. It contained two small carbonized seeds. Flakes of quartzite occurred throughout the charcoal area and the immediately adjacent gravels; the charcoal area evidently was part of a pit. No cultural material was found below 27 inches.

Aside from pits or other features, the general maximum depth of cultural material in squares 7-3, 7-4, and 7-5, was 13 or 14 inches. Except for the top 4-inch level of big blades and masses of chips in humus,

> the deposits have the appearance of glacial till and might so be described, if it were not for the presence of cultural material in them. From 14 to 27 inches, the deposits are made up of slightly argillaceous sands with scattered pebbles and occasional small boulders up to 17 inches diameter. This material is reddish brown and full of recent tree roots. The pebbles and boulders tend to be sub-angular. At 27 inches post-glacial lake deposits appear. Below this an incomplete section shows 3 feet of gray material containing rusty spots. This material is mostly soft, but has harder layers, probably richer in clay. Some of it is washed sand and silt. Occasional pebbles and small boulders of black Ordovician shale and igneous material, probably all ice-rafted, occur. Some pure clay is present toward the bottom of the section. (John Sanford, Wayne University, from preliminary inspection when the section was made.)

The apparent presence of pits, presumably dug for refuse long since disintegrated, demanded further attention. Beginning at depths of 13 inches in 7-5 and at 10 inches in 7-3, the position of every flake of quartzite was plotted, for each 2 inches of depth. The superimposed plans leave no doubt whatever that the chip concentrations were in pits, although not the slightest trace of an outline could be seen. A few scattered chips continued to appear throughout the gravels.

Careful examination of the trench profiles revealed no clear-cut stratigraphy, unless we may count the rather irregular lower line of dark humus at approximately 4 inches, which coincides fairly well with the masses of quartzite chippings, resting upon sands and gravels of buff-orange and reddish-brown coloration. We are forced to rely more upon superposition and to this end we must exercise great care in noting depths and indications of subsequent disturbances. The procedure will necessarily be slow. At some points on the profiles, the dark soil and the quartzite chips dip as though pits had been sectioned, but the outlines are better marked by chips than by soil color or texture. In 7-5, on the south profile, both soil color and chips indicated that a large pit, perhaps extending across 7-4 also, had been filled with debris by the makers of the largest blades. Plans of the 7-5 levels show a poorly-defined north-south line coinciding with the dip of humus and chips on the profile. Recalling that only the south half of 7-4 contained cultural material below the 14-inch level, we are faced with the possibility that a semi-subterranean shelter existed here.

The second excavation was undertaken on what appeared to be a hillside dump. The general appearance indicated that a very shallow ravine along a slope had been filled from above with the debris of quarrying; several accumulations assumed the form of very low mounds. Much of the debris was completely exposed or very lightly covered with grass and leaves. From the surface, several unfinished or broken blades were removed. It was expected that similar finds would be made throughout the debris. The spot was selected on the assumption that the deposits would be shallow — perhaps 2 feet deep — and that suitable techniques would be devised through practical experience for use later on the largest, and presumably deepest, hillside dump. No stratigraphy was expected and superposition might not be as closely controlled as in trenches in the supposed habitation area.

The adjacent trenches (HD 1, HD 2, and HD 3), oriented to include 3 "mounds" of debris in the filled "ravine," were laid out. Dimensions varied, but did not exceed 14 feet to a side. The corners extended out over sodded areas, since the mounds were of an oval shape. So coarse was the debris that even 6-inch levels were difficult to maintain. Fragments were removed by hand, one by one, examined, and cast aside. Significant artifacts were photographed in situ. The first 6-inch level merely reduced the low mounds. The second stripped the sodded corners, exposing debris everywhere. HD 3 was pushed most rapidly toward completion. Large areas of very fine chippings were noted from 6 to 12 inches. Charcoal was encountered, but it is almost certainly the result of fire following roots into the loose debris.

At 12 inches, a fine, gray podzol soil began to take prominence, scattered throughout the finer chippings. At this point a small hand cultivator tool was found most useful in raking

the chips and fragments into small piles for removal. At 12 inches, a buff-orange clay began to predominate on the south side of the trench. It contained quartzite chips, but very quickly gave way to a large outcrop of schist. On the north side of the trench, solid quartzite rubble persisted to a depth of 30 inches. Quartzite chips and fragments, set in red clay, continued to a depth of about 42 inches, at which point the surfaces of an old quarry appeared. It became evident that the supposed shallow ravine might really be the remains of an extensive Indian quarry. At one point in HD 3, where a deposit of pure clay occurred, a deeper test hole was dug. The clay was devoid of cultural material and was of a striking greenish shade. Probably it was affected by the schists. It appears to have been deposited in a lake bottom.

When the supposedly shallow hillside dump was found to have considerable depth, it became necessary to abandon HD 2 for the season, when only the first foot had been removed. Already, however, a quartzite outcrop, apparently quarried, had been encountered at the west end, farthest from HD 3. From its orientation it is believed that it connects with the quarry observed at depth in HD 3.

Meanwhile in HD 1, the most westerly trench, a shoulder of red clay appeared along the south wall, at about 12 inches. It sloped northward into the trench. Since chips and artifacts were found within it, the possibility of stratigraphy was recognized and the shoulder was left intact until completion of the loose rubble deposits. As work progressed in the rubble, outcroppings of quartzite began to intrude slightly from the east and west ends and from the north side. Their jagged surfaces very plainly had resulted from quarry operations. At 30 inches the eastern outcrop stepped into the trench a distance of 3 feet, and then dropped vertically. The red clay shoulder dropped very steeply into the trench. Finally, at 52 inches the entire floor of the trench, except for the red clay area, was seen to be the rough floor of a quarry. Artifacts had decreased in numbers, level by level. Blades were mainly unfinished, but appeared to resemble those from the top level of the habitation area. A few small hammerstones were found, along with several very large and heavy hammers, up to 12 inches in diameter.

Attention was then directed to the red clay shoulder. Throughout the clay were found chips, never in abundance, and a few artifacts. Some resembled the big blades of the top habitation area level, but they occurred near the edge of the shoulder, where the dividing line was in doubt. A very few of the finer blades were found as much as 20 inches down, bearing the secondary chipping of the oldest component recognized in the habitation area. Here, then, is actual stratigraphy in support of the superposition indicated. The number of artifacts is regrettably small. At 14 inches in the red clay, some loose blocks of quartzite and schist were encountered in a broken line running parallel with the south wall and 2 feet from it. At 20 inches depth, these had become a continuous wall of quartzite, about 6 inches thick, dipping slightly to the north. No cultural material was found below 24 inches, between the quartzite wall and the south side of the trench; there remained only a narrow strip of red clay and rubble to be examined on the north side of the wall. Little was learned from this, as most of the finds were too close to the dividing line between clay and rubble to be relied upon, but near the 48-inch level, set in red clay close to the wall, one of the finely chipped blades was found in unquestionable circumstances.

It is seen, then, that by chance HD 1 had been placed precisely over an ancient Indian quarry of dimensions 10 by 14 feet, assuming even the same orientation. The quarry was worked straight down into tough quartzite which at this point is almost lacking in visible banding, except for the single 6-inch wall at the south side. The method employed in quarrying is not readily apparent, although the unusually large hammerstones suggest a mauling and perhaps wedging operation. A mass of blackened fragments at one point may indicate the use of fire and water, but it should be considered that carbon from forest fires might have seeped down into the quarry basin, to be redeposited on the rocks. The quarry was probably the work of the group responsible for the finely chipped blades, since at least one of these was found at the bottom of the red clay shoulder underlying the rubble. We may assume that the quarry, and perhaps several more like it, was then filled up by the

rejects and rubble from a later quarry farther up the slope, presumably cut by the makers of the big blades of the upper level.

Types of Artifacts

Blades. In the initial steps of analysis, we were confronted with the problem of handling 4000 specimens of remarkably large size in a very cramped space. A partial solution was reached by setting up a card system, each card bearing the outline of a blade differing from others in shape, with a number assigned to each. In this manner more than 60 subtypes were set up, each easily distinguishable from all others. Blades were then compared with the cards and reduced to a few pages of notes. It is expected that further studies will justify grouping most of them into a half dozen or fewer basic forms. Sizes range from about 3 inches to 10 inches long, one inch to 6 inches wide, ¼ inch to 2 inches thick. An average length is about 5½ inches. It is noteworthy that, according to excavations thus far undertaken, the blades become progressively larger as the surface is approached, although some small blades, of course, are found with the large. All are quartzite, except for one flint blade found at a depth of 3 inches.

Very few of the blades are sufficiently pointed to be considered as penetrating implements. Indeed, where signs of use are apparent, such signs are usually at or near the rounded bases, as if the blades had been used as hafted scrapers; in many cases the chipping has been more carefully done near the base. Some of the thin blades, especially the semilunars, appear to have been used in some cutting operations, as sections of the edges have become smoothed, both to touch and sight, reflecting light from the narrow polished edges.

Relatively few specimens show secondary chipping and there are indications that these represent the oldest recognized component.

Some effort has been made to use points and bases of blades in statistical comparisons, since the majority of the finds are broken blades. Unfortunately, repeated tests have shown that the correct point cannot be predicted for any base. However, useful supplementary information may be gained.

Scrapers. These assume several shapes. The largest are over 9 inches long and probably were hafted. A few large end scrapers occur, but most are side scrapers, about 3 inches long, finely chipped along one edge. All are quartzite, except 2 small flint specimens found near the surface.

Drills. Only 2 have been found; both are flint and are small, with expanding bases. Found on or near the surface, they are thought to represent Point Peninsula.

Projectile Points. Only 5 and part of another have been found and no two of them are alike. All are of quartzite. Only 2 are notched, while a third is slightly stepped in at the base. Only one shows neither basal nor lateral smoothing; the others have one or both to a marked degree. Two of them might possibly be assigned to Point Peninsula; the others belong to some earlier group or groups. These will be considered more thoroughly in a later report.

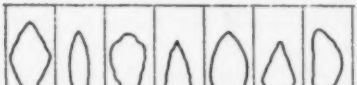
Hammerstones. Numerous examples were found, usually very much battered. Some had been reduced to nearly perfect spheres. Two had assumed the shape of disks. Most are irregular. A few reached the astonishing size of nearly 12 inches diameter in the quarries.

Used flakes. Many flakes are thought to have been used as cutting or scraping tools, without intentional shaping. Some fine chipping does occur along the edges, but this might result from the mere use of a thin flake on wood. In fact, when first searching for such tools, some guide examples were made by picking flakes at random and using them to cut into hard maple. The edge quickly acquired an appearance suggestive of use, with sections smoothed considerably. Scraping would produce both smoothing and fine chipping along one side of a flake.

Site Comparisons

It is our purpose here to consider only 2 sites assumed to be very closely related to Sheguiandah in time and space. Neither has produced enough complete blades for adequate comparison, but the similarities are apparent. All 3 have large quartzite blades of similar dimensions and shapes. All are preceramic, and all can be thought about as workshops. All are at or near quartzite outcrops. There are certain noteworthy points of difference. The Sheguiandah site is on a hilltop; the Giant site (Lee 1954), is at the base of a quartzite ridge; George Lake 1 is on a high beach line. Sheguiandah has a more extensive trait list, due in part to excavations, size, and

TABLE 1. PRINCIPAL BLADE FORMS OF THREE ONTARIO SITES.

	
Sheguiandah 337	15 4.4% / 69 21. / 6 1.7 / 16 4.7 / 176 52. / 4 1.1 / 51 15.1
Giant 87	2 2% / 15 22.4 / 3 4.5 / 4 5.9 / 38 56.7 / 2 3. / 3 4.5
George Lake 1 24	1 4.2% / 3 12.5 / 0 / 4 16.7- / 9 37.6 / 0 / 7 29.1

richness, but principally because it alone appears to be stratified.

Comparisons with George Lake 1 material at the moment must be based only upon a set of photographs kindly supplied by E. F. Greenman. These permit only an evaluation of sizes and shapes; chipping techniques are not readily apparent, but general appearance suggests a very close relationship with the upper level of large blades at Sheguiandah and Giant. Secondary chipping or pressure flaking is very poorly represented at the Giant site (10 examples, 8 of which are in question, out of 336 specimens), but is a prominent feature of Sheguiandah; present indications are that it is a characteristic of the lower level of large blades.

The physical characteristics of both Sheguiandah and Giant suggest actual habitation areas as well as workshops. Excavations at Sheguiandah further support the view, in the form of pits, numerous accumulations of charcoal, very fine tools and scrapers, large scrapers and blades showing use, and one possible semi-subterranean shelter. Conditions are ideal. In any case, it would not be surprising that people who carried out the enormous amount of work done here should also have lived on the site. If defense entered into their calculations at all, a better site would be hard to find.

In Table 1, are shown the principal blade forms of the three sites, in terms of totals available, numbers of blades falling into each type by sites, and their percentages on each site. Only surface material is considered for Sheguiandah and Giant. The total of George Lake 1 as represented in photographs is used. The accompanying trait list (Table 2) is based on the total materials from each site, again employing photographs for George Lake 1. The approximate total specimens for each site is indicated.

No definite determination of age has been reached. Of the numerous charcoal samples, not one is sufficiently large for radiocarbon methods. Geological estimates have ranged from 5,000 to 10,000 years. Archaeological estimates have ranged from 400 to 8,000 years. Somewhere within these broad limits, presumably, lies the correct date. There are certain observed phenomena which should assist in arriving at a reasonable estimate, however. Foremost is the presence of a well-developed wave-cut notch, the base of which is 71 feet above the 1952 level of Lake Huron, and the fact that neither the large quartzite blades nor the chippings from them have been found below that notch, despite extensive searching by some 45 individuals. Immediately above the notch, both occur in amazing profusion. When was the water at this level? Geological opinion varies greatly.

It has been postulated by many authorities that the site is only a workshop, a place to which various groups came to obtain material, which was then carried away for reworking;

TABLE 2. TRAIT LIST FOR THREE ONTARIO SITES.

Trait	Sheguiandah 3108	Giant 377	George Lake 1 156
Large diamond-shape blades	15	2	1
Narrow leaf-shape blades	69	15	3
Triangular blades	16	4	4
Large ovoid blades	176	38	9
Large semi-lunar blades	51	3	7
"Rolled" blades	80		X
Flint blades	1		
Large notched scrapers	6	3	
Side scrapers	X	X	X
Flake scrapers	X	X	X
Flint scrapers	3		
End scrapers	X	X	X
Notched projectile points	2		
Un-notched projectile "	2		
Stemmed projectile points	1		
Hammerstones	67	6	
Spherical hammerstones	4		
Disk hammerstones	4		
Flint drills	2		
Quartzite perforators			3
Used flakes	X		
Chipped slate	X		
Chipped quartz	X	X	
Secondary flaking	156	8	7
Stratigraphy	X		

if this is the case, the evidence has escaped the writer's attention. A fairly careful survey of Manitoulin Island produced no large quartzite blades or chippings other than on specific sites, all but one of which were adjacent to outcrops and quarries. The exception yielded only 3 blades or fragments. A 5-year survey program carried out by the writer in southern Ontario, producing about 48,000 specimens, plus the examination of about 300 private collections, has failed to turn up similar quartzite blades, with the exception of a half-dozen in one area near Manitoulin. The answer might lie to the north, although great ridges of quartzite occur in that direction. Perhaps some of the quartzite blades found in the United States came from here; to be accepted, of course, they would have to present identical characteristics in thin-section examination. This is true also for the occasional quartzite points found in collections. In the absence of evidence that the blades were carried away to any extent, it is much more satisfactory to proceed on the assumption that they are not found below the wave-cut notch because the water stood at that level, the hill-top was an island, and the needs of subsistence were met successfully right at the site.

There is the question of whether the objects found represent finished tools or merely blanks. In the case of the lower level of large blades, the specimens are finely chipped, thin and sharp; there would seem to be little point in adding the delicate retouching of the edges, only to smash them away later in making a tiny projectile point. The case is not as good for the upper level, where secondary chipping is rare or absent, but it should be remarked that the blades are much thicker; quite apart from edge trimming, the finished blade is relatively thick and crude. Even here, however, there are indications that should not be ignored: many of the blades, including the largest, show definite edge wear, attributable only to use, in our opinion. The numerous shapes of blades seems purposeful, when related to the indications of wear. Apparently the broad rounded base was employed as a scraper; seldom is evidence of wear found at the pointed end. Many of the edges are smoothly blunted as though used in cutting; when held in a line between eye and light, a slight polish can be detected.

If the large blades are not finished tools, where are the finished tools? Is it conceivable that this amount of work could be done without workers losing or breaking some of their finished tools? Broken specimens are available in terms of thousands, but they seem to be only parts of big blades, neither smaller nor better.

All evidence indicates that the site is preceramic. We would assume that the population was never large, yet an enormous amount of work has been done. Excavations show that in places the accumulations of debris are 5 feet deep. The largest accumulation, covering ⅓ acre, is thought to be much deeper. Entire ridges have been quarried away, their stubs now concealed under debris. Large pit quarries are believed to exist, following the discovery of one under a pile of debris in HD 1. The entire site demands explanation either in terms of a large body of workmen or a very long period of time; the former seems improbable.

In the supposed habitation area, artifacts, chips, and charcoal occur in gravel-boulder deposits to a maximum depth of 27 inches. The manner of accumulation is not satisfactorily determined, but rain wash on the hill-top cannot account for the presence of such boulders. Some other natural agency is involved. With only a very little sorting observed, water action seems unlikely. Whatever the process, it has been halted since the occurrence of projectile points at the 6-inch level.

The presence of pits has been established. If refuse was thrown in them, no visible evidence remains. No bone has been found, but the soil is believed to be unsuitable for bone preservation, even for a short time.

Of the four recognized components, only the second or upper level of large blades seems closely related to George Lake 1. The similarities and geographical proximity are such as to support the view that they are not far apart in time. George Lake 1 has been variously dated at 17,000 and 15,000 years. More recently, Greenman was quoted in the *Globe and Mail*, Toronto, September 4, 1952, p. 15: "There is no doubt that our 297-foot site is twice as old as Lee's at the least, and today I'll settle for 6,000 years." Even this may be unduly generous for George Lake 1, however, since Greenman (1943:517) states that "the contemporaneity of the cultural materials of GL 1 with Lake Huron at that level is a deduction based entirely upon the worn condition of eleven artifacts, a considerable number of flakes, and one tortoise core." By this means he ties his site with the 297-foot beach. The

following may throw further light on the subject. The earliest collections made at Sheguiandah included several very much worn quartzite blades; as most of them came from the vicinity of the wave-cut notch, it was assumed that they had been "rolled" by waves on the beach. Presently this view was thrown in question, when "rolled" artifacts began to appear elsewhere on the hill, even to the highest point. Still more surprising, they were found in the test trenches, both in the habitation area and in the quarry rubble, as much as 31 inches below the surface. One blade had acquired a considerable sheen over most of its surface, suggesting to Sanford that wind action was involved, possibly on a beach. The entire group of about 60 specimens was later examined by 7 geologists at the National Museum. Their opinions differ as to causes, but wave rolling was rejected. They pointed out that the edges of blades are not worn in a manner suggestive of wave action. Further, some specimens are most worn in the low spots, others on the higher places, some in only one place, some on the edge only, some in the center only. With serious doubt thrown on the wave-rolling theory, the differences in elevation for the sites lose their meaning and the dates for George Lake 1 cannot be regarded as a secure foundation for dating Sheguiandah. Little more can be said than that the upper level large blades at Sheguiandah are probably of about the same age as George Lake 1.

Under the large blades, moreover, are two distinct cultural manifestations. The first yields the few projectile points which are illustrated. Some authorities have called them Point Peninsula. To the writer they seem to have very little resemblance to Point Peninsula; certainly they are quite unlike any Point Peninsula projectile points thus far obtained from sites in Ontario. On the other hand, certain features suggest much earlier connections. The basal and lateral smoothing is unusually pronounced. One base is slightly stepped in, after the manner of Scottsbluff but to a lesser degree. Flaking seems indefinite, but the nature of the quartzite may have some bearing. The quartzite in one point is unlike anything yet seen at Sheguiandah and probably did not come from the site.

Below the projectile-point level occurs a quite extensive big-blade level. The completed blades or fragments of them are readily distinguished by the secondary chipping, their shape, and dimensions. The people who made them certainly carried on extensive quarrying, an activity which must have taken a long time, if the deep quarry uncovered in HD 1 is at all representative. The scattered quartzite flakes and flecks of charcoal at greater depth in the gravels may represent another considerable time period. In the absence of definite artifacts little can be said.

The Giant site has some bearing on the subject. It seems most closely related to George Lake 1 and to the upper level of Sheguiandah large blades. Secondary chipping is almost absent. Under otherwise ideal conditions for finding projectile points, none has been found. It seems significant that the elevation, determined by several barometer and altimeter readings, is about 70 feet above Lake Huron.

From the above indications, inconclusive though they may be, it seems not too rash to suggest that the Sheguiandah site is among the earliest yet found in Ontario.

In an unpublished survey report for 1951, the writer has suggested that the makers of the large blades at Sheguiandah did not die out or mysteriously vanish; rather, that they crossed on the ice via a chain of islands to the Bruce Peninsula, carrying only as many of the blades as might be required for the immediate future. That a few such blades have been found has already been indicated. Finding no quartzite outcrops there, they may have turned to other materials occurring along the shore, producing some of the remarkable early manifestations observed in Bruce County.

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THE LITTLE SYCAMORE SITE AND THE EARLY MILLING STONE CULTURES OF SOUTHERN CALIFORNIA *

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THE PRESENCE in the southern California coastal region of prehistoric cultures showing considerable use of milling stones has been recognized for some years.† Attention was called to this fact by the publication in 1929 of David Banks Rogers' *Prehistoric Man of the Santa Barbara Coast*. Rogers distinguished a sequence of three aboriginal cultures in the Santa Barbara area, the earliest of which (Oak Grove) was characterized by the employment of this form of grinding implement almost to the exclusion of other artifacts. In the same year Malcolm J. Rogers noted a somewhat analogous complex (now La Jolla) in western San Diego County (M. J. Rogers 1929: 456-7). Occurrences of similar assemblages have been reported upon since (Treganza and Malamud 1950; Walker 1952).

An investigation conducted at the Little Sycamore site (Ven 1) in Ventura County by a class in archaeological field methods from the University of Southern California uncovered evidence of yet another milling stone complex. Excavations were made during the spring semester of 1952, a period of fifteen weeks. Nineteen students participated in the work.

The Site. The Little Sycamore site is located in southwestern Ventura County, 1.2 miles west of the Los Angeles County line. The surrounding district exhibits the typical topography of the southern California seashore with a narrow coastal strip edged by steep-sided, chaparral-clad hills. The latter are cut through by Little Sycamore Creek which empties into the ocean just west of the site. Along the narrow stream course are sycamores, willows, and occasional stands of oaks. The natural resources were ample for the support of an aboriginal population. Although large land mammals were probably never numerous, the sea and land provided other wild foods in variety and abundance. Little Sycamore Creek supplied adequate fresh water during most months of the year. Stone and other raw materials for making implements were close at hand.

The site consists of an accumulation of village debris containing a considerable amount of shell which almost covers a level tongue of land jutting out into the Pacific Ocean (Fig. 37). The archaeological deposit is not homogeneous throughout. The upper 2 feet consists of relatively unconsolidated black earth; below to a depth of 5 feet is a compacted, yellowish-red soil cemented by finely granular calcium carbonate. This stratum was apparently formed by the leaching of the upper layer with a redeposition of calcareous material at a lower depth. Artifacts and bones recovered from it were heavily lime-encrusted. At the base of the deposit is a reddish clay in every respect similar to that forming the surface of the surrounding hills.

The area covered with refuse measures 375 by 495 feet. Two trenches, each divided into 5-foot squares, were excavated at opposite ends of the deposit. In the west section 200 square feet were dug; on the east 300 square feet. Each 5-foot section was scraped away in 6-inch levels with trowels except near the base where shovels and, occasionally, picks or mattocks were needed to cut through the hard soil.

Subsistence. The main economic interest of the Little Sycamore inhabitants was not in hunting or fishing but in the collection of shellfish and wild plants. The predominance of bay mussel valves in the refuse indicates that this was the favorite mollusk, with black abalone next in order. Other varieties were consumed only to a small extent. Although no traces of vegetable foods were recognized, it may be presumed from the quantity of seed-

* The photographic illustrations were prepared by Roger J. Desautels and Edith S. Taylor. Figure 39 was drawn by Desautels. The unmodified mammal and bird bones were identified by Jack Nicoll, major student in anthropology and zoology at the University of Southern California. The identification of stone materials was made by Richard H. Merriam, Associate Professor, Department of Geology, University of Southern California.

† "Milling stone" is used instead of the usual Californian "metate" in conformity with the increasing tendency among North American archaeologists to reserve the latter term for a rectangular slab on which maize is ground with a back-and-forth motion.

grinding implements that native plants provided a fair share of the diet. The over-all scarcity of mammal and bird bones combined with a small sample of projectile points suggests that hunting was a secondary pursuit. The California mule deer was the most important game animal with the sea otter second. Water fowl, especially large species such as the brant cormorant, western grebe, and brown pelican, were hunted. Fish appear to have been rarely caught and eaten.

Artifacts. A total of 637 artifacts was collected: 539 of stone; 71 of bone; 26 of shell; and 1 of antler. They are characterized by simplicity of form and manufacture, with many shaped only through use. The classes of artifacts and the total numbers from the excavation are as follows:

Milling stones	116	Flaked core hammers	8
Handstones	123	Rubbing stones	9
Mortars	3	Whetstones	6
Pestles	6	Bone bi-points	8
Pendants	3	Bone single points	6
Charmstones	4	Basal-notched bones	3
Projectile points	13	Bone tubes	2
Drills or gravers	5	Bone spatulates	4
Choppers	21	Bone awls	18
Scraper planes	19	Olivella beads	13
Flake scrapers	43	Abalone pendants	2
Core scrapers	6	Cowry pendants	2
Pebble hammers	83	Shell trumpets	2
Pitted hammers	50	Utilitarian shells	4
Flaked-edge hammers	14		

Other than an increase in numbers in the lower levels, no stratigraphic differences or changes are noticeable in the artifact inventory. Apparently the site was occupied by a single cultural group over a fairly long period of time.

The most striking feature of the artifact assemblage is the considerable number of milling stones and mullers, 116 and 123, respectively. The milling stones exhibit evidence of wear on one surface only, though some are scratched on the underside as if dragged across the ground. Of the group, 75 are basined, with depressions ranging from shallow to those worn almost through the stone. The remainder are flat slabs without marked concavities. All are large and cumbersome, most weighing 100 pounds or more. Mullers or handstones are medium-sized, naturally oval pebbles. Eighty exhibit use on only one surface; 23 have two grinding faces; and a small group of 10 are multifaced, with the utilized surface encircling the entire specimen. Some examples are worn quite thin, whereas others appear to have been scarcely used. A medium-grained sandstone was employed for the manufacture of all grinding implements.

Mortars and pestles are present, although not in numbers. Two mortar fragments were collected, one on the beach adjacent to the site. Of the pestles, 5 are cylindrical and quite similar in form to the multifaced handstones.

FIG. 37. General view of the Little Sycamore site (Ven 1). The archaeological deposit covers the entire promontory to a depth of about 5 feet.

One is conical and two are unworked beach or stream cobbles. A single crude basket-hopper mortar was found.

A small variety of pecked and ground stone objects made for adornment or ceremonial purposes was found. Included are two rectangular pendants drilled near one end; one grooved pencillike pendant; one steatite disk bead, 4 unperforated charmstones (Fig. 38 *a, b, c*); a barrel-shaped object with concave ends; and a few incised pebbles. A pitted stone discoidal with the edges ground smooth (Fig. 38 *d*) and a finely-fashioned pipe of soapstone were also secured.

Natural or only slightly modified stones used as tools were plentiful. One hundred and fifty-five hammerstones were collected: 73 are oval or round pebbles showing marks of use along one or more edges; 49 have small pits on one or two surfaces; 14 are similar to choppers in having a chipped edge; 8 represent percussion flaked cores. The surprising wealth of this class of tool indicates some function other than the flaking or pecking of other stone implements. Some, undoubtedly, served this purpose but the majority may have been employed in smashing molluscan shells in order to extract the meat. Nine small quartzite pebbles having flat, rubbed surfaces were secured. These do not appear to have been used for the same purpose as handstones and are classed as "rubbing stones." Six small, elongate, sandstone pebbles with one surface of the long axis worn and flattened by grinding were presumably used as whetstones or hones.

The chipped stone industry was not well developed. Only 12 projectile points, whole and fragmentary, were obtained. They are large and crude in workmanship with most made from a poor grade of chert. The points are mostly nonstemmed with convex base (Fig. 39 *a-c, e-l*). Presumably they were used to form the tips of darts thrown with the atlatl. The straight base of a large blade (Fig. 39 *d*) is the only representative of this class of artifact although one specimen, listed as a projectile tip (Fig. 39 *a*), if hafted, may also have served for cutting and scraping. Eight unspecialized drills or perforators were found.

Scrapers made from irregular flakes of chert and retouched along one edge are the most numerous of chipped objects with 53 examples. Cores were coarsely flaked into wedge-shaped scrapers, 6 of which were unearthed, and planes, 19 of which were recovered. Somewhat larger are 21 rough choppers shaped from thin cores or thick flakes. These crude tools probably had some heavy-duty function such as cutting limbs of trees or severing bone. They are variable as to size and form.

Bone items are few with only 71 specimens in the collection and 23 of these are doubtful tools. Awls or perforators, more or less sharply pointed objects that vary in size, shape, and degree of finish are the most common of the worked bone pieces, numbering 18 specimens.

FIG. 38. Charmstones and discoidal from the Little Sycamore site.
Length of *a* is 7 cm.

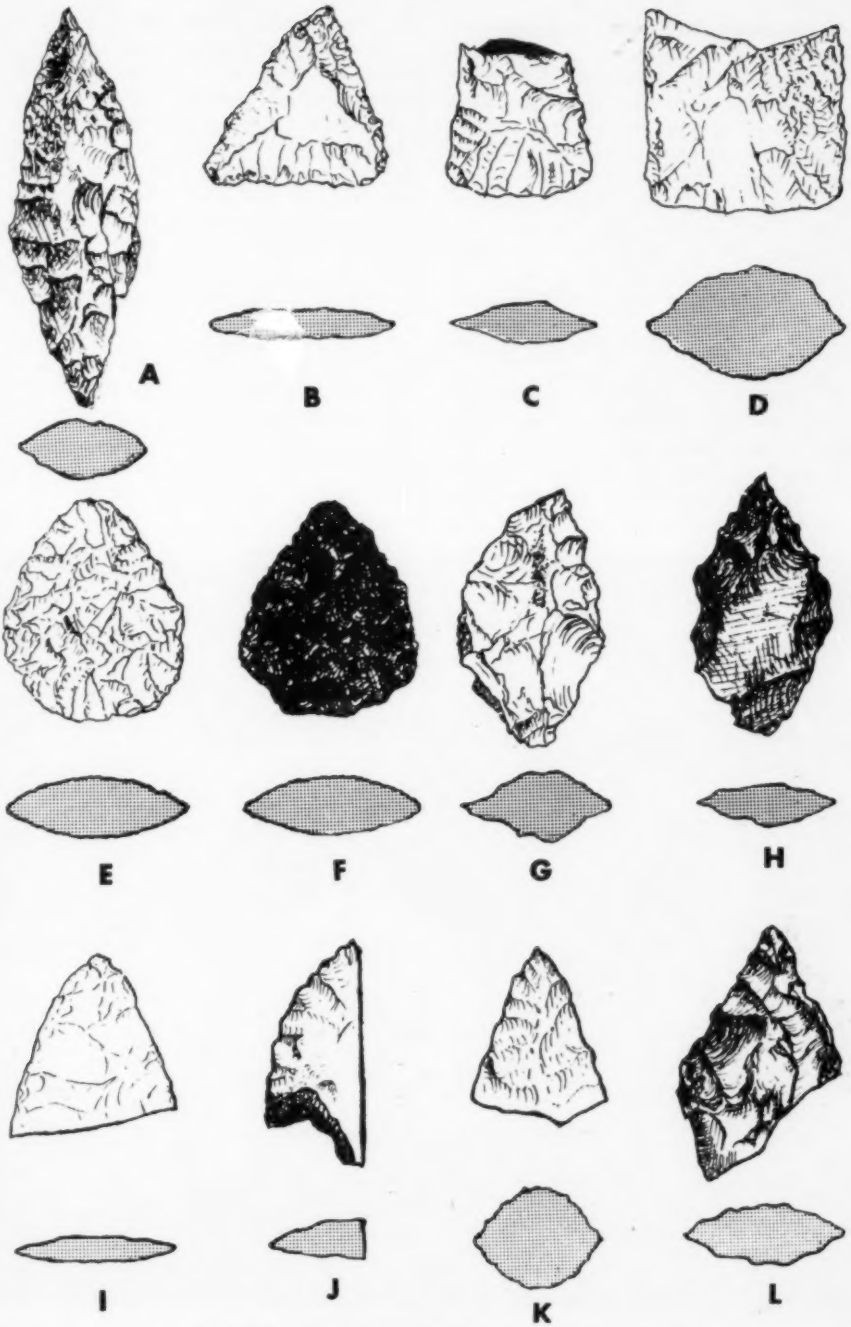

FIG. 39. Projectile points and blades from the Little Sycamore site. Length of *a* is 6.3 cm.

Deer leg bones usually served for their manufacture though a few examples made from sea mammal and bird bone are included. Most show little modification beyond cutting from their sources. Twenty-three pointed splinters may also have been used as makeshift awls or perforators. More skillfully shaped are 8 bipointed objects each with a distinct central flattening. The use to which these were put is conjectural, though employment as gorge hooks for fishing is suggested. They may, however, have been bodkins used as garment pins or for ear or nose ornaments. Seven carefully rounded bone splinters, pointed at one or both ends, are somewhat smaller in size. The remainder of the bone implements comprise 3 basal-notched polished sections of mammal rib; 4 flakers; 4 spatulate-ended objects; 2 plain bone tubes, 1 mammal and 1 bird, with cut ends; a well-made flute with 3 holes, fashioned from the leg bone of a large bird; and a perforated pendant corresponding in outline to the stone examples. There were other miscellaneous cut and worked pieces of bone not definitely recognizable as artifacts.

A conical-headed, shouldered object with a relatively broad flat stem is the sole object of antler. Its form suggests use as an atlatl hook with the butt end of the dart resting against the square-cut base of the cone. The piece is carefully shaped with traces of a high polish remaining. The absence of cut and worked deer tines, so frequently met with in other California sites, is noteworthy.

There is a scarcity of shellwork. A simple form of bead was made by removing the spires of purple olives to permit their stringing. Thirteen, all isolated examples, were collected. A pendant, roughly hexagonal, with two perforations near one end was manufactured from black abalone shell. Two chestnut cowries, each with an irregular hole punched through

FIG. 40. Cairn of milling stones, Little Sycamore site. The cairn was only partially exposed.

the back, perhaps for suspension, were obtained. Two univalve shells with the tips cut or ground off may have served as trumpets or bird calls. They are of the Kellett's whelk, one of the largest gastropods on the West Coast. Forcing air into one end results in a shrill note. Four miscellaneous objects seem to have served some utilitarian purpose. One, a section of the hinge of a large clamshell, has a broad rounded blade at one end; a second piece of clamshell has a blunt, shouldered tip; the 2 remaining items, one of clam and the other of mussel shell, are pointed.

The soil conditions were not favorable for the preservation of perishable items and none was recovered. Undoubtedly, raw materials such as wood, plant fiber, and animal skins were extensively used in the fabrication of artifacts.

Features. Nothing which suggested a dwelling or other architectural feature was encountered. A single hearth consisting of 7 medium-sized stones arranged in a roughly circular pattern was observed. A lens of charcoal was exposed adjacent to it. Six additional rock clusters were observed but as ash and charcoal were absent it was assumed that they were not fireplaces. A shallow storage pit covered with a grinding slab was cut into the subsoil to a depth of a little over 8 inches.

The largest feature (Fig. 40) was a great cairn of milling stones, many of which were killed by having the bottoms knocked out. Most of the stones were inverted. The cairn was of tremendous size, extending throughout 5 of the 5-foot squares and continuing for an unknown distance into portions of the midden which were not excavated. Artifacts, mainly

FIG. 41. Flexed burial at Little Sycamore site.

mullers, and fragmentary human bones were recovered from beneath the stones and from the spaces between them. Milling stones must have been added to the pile at intervals over a long period of time. A similar cairn was uncovered in the San Fernando Valley (Walker 1951: 15-26). The site at which this concentration occurred yielded few evidences of human occupation and was considered to be a ceremonial place rather than a settlement.

Burials were encountered at both ends of the site. In the east trenches, they were clustered under the heap of mealing slabs; those at the western end were isolated inhumations. A total of 15 interments, 13 adults and 2 children, was exposed. In addition there was a vast quantity of dissociated and broken bones. The skeletal material is semimineralized.

Of the 15 burials, 5 were in a flexed position, with 4 on the side and 1 resting face down (Fig. 41). The remaining 10 were probably partial secondary burials. At least 4 had the skull and long bones reinterred in an orderly fashion (Fig. 42). The latter were probably reburials from an earlier or temporary inhumation. The others were disarranged and incomplete and may have been disturbed by aboriginal digging.

The placing of stones, most often grinding slabs, over corpses, was general, having been noted for 10 of the 15 interments. In 7 instances, whole black abalone shells had been placed around the bodies. Other than these, grave goods were uncommon. A small quantity of powdered red ocher was observed on 3 skeletons.

FIG. 42. Secondary burial at Little Sycamore site.

Age Indications. The question of the time of occupation of the Little Sycamore shell mound is one that cannot be answered with any exactness until radiocarbon dates are available. The problem of the antiquity of this and seemingly related sites will be discussed in a later section.

Relationships. There are four cultural assemblages in the coastal district of southern California which bear considerable resemblance to the Little Sycamore material. A trait by trait comparison is not possible because, of the four, only the Topanga culture is described in any detail. Even here the results of a second season of digging have not yet been published.

Oak Grove. The best known of the complexes is the Oak Grove of the Santa Barbara region (D. B. Rogers 1929: 342-55). The people were so named because of an apparent preference for locating settlements in oak forests. Their culture has been briefly summarized (Orr 1943: 34 and 1952: 213) as comprising milling stones and mullers, crude projectile points (or blades), prone burials, generous use of paint, lack of ornaments, steatite, and asphalt, and a scarcity of mammal bones. There is, in addition, an infrequent use of bone for tools and an absence of items of shell. Houses are described as semisubterranean. Oak Grove archaeological deposits are heavily indurated and artifacts and bones recovered from them are covered with thick encrustations of lime.

The closest approximation of the Little Sycamore assemblage probably lies with this Santa Barbara culture. Not only are milling implements, roughly-made projectile points (often leaf-shaped), and the rare employment of bone shared, but also such elements as the infrequent use of mortars and pestles, retouched large flakes, and simple hammerstones. In addition to tool types held in common there are a few parallels in mortuary customs such as the practice of inverting milling stones, frequently killed, over burials, the use of red ocher, and a paucity of grave offerings. Distinguishing features include the extended burial posture, more generous utilization of paint on corpses, curved stone blades, and the complete absence in the Santa Barbara complex of pitted hammerstones, charmstones, and shell artifacts.

The concentration of the early Santa Barbara inhabitants upon a vegetarian diet and their neglect of shellfish resources also sets them

apart from the Little Sycamore villagers. Only a few traces of shellfish have been observed in Oak Grove settlements. The Santa Barbarans are said to have hunted small animals and birds but not large species. The mammal remains from Little Sycamore, on the other hand, were primarily those of large forms.

It has been stated that artifacts attributable to Oak Grove have been found from Morro Bay to the southwestern corner of San Diego County (Holt 1937: 7). Actually there is no tangible evidence for this, as "Oak Grove" frequently has been used to designate any site producing milling stones or dolichocephalic skulls. The Early Mainland culture of Santa Barbara described by Olson (1930: 16), like Oak Grove, shows a high frequency of milling stones but the remainder of the artifact inventory is distinct. A shell midden at Point Sal (Carter 1939: 215-6) produced handstones in two lower strata but again in a somewhat different assemblage. These occurrences are regarded as less ancient (Orr 1952: 216-8) and as representing a carry-over of the grinding implements into a later phase.

Topanga. The Topanga culture is known from the excavation of the Tank site (Treganza and Malamud 1950) and from an earlier survey (Heizer and Lemert 1947). The Tank site is situated some 4 miles inland from the Pacific in Topanga Canyon, just north of Los Angeles. The cultural assemblage is distinguished chiefly by a surprising array of rude percussion-chipped core and flake tools. There is a preponderance of milling stones and mullers over mortars and pestles, a scarcity of projectile points, and an exceedingly low frequency of bone and shell artifacts. The refuse deposit is hard and is in an advanced stage of metamorphosis.

In addition to obvious general resemblances to the Little Sycamore material, several fairly specific traits are shared. Included are stone discoidals, a variety of chipped core hammers, incising on stone, and partial reburials under inverted milling stones. Some of the "lozenge-shaped" projectile points approximate the dominant Little Sycamore form. Not duplicated at Little Sycamore are the imposing abundance of crude flaked tools, stone "cogs," and prone burials. The economy of the Topanga people is assumed to have been based upon seed gathering, on evidence of the many grinding appliances and the general scarcity of food remains such as bones and shells.

Malaga Cove. The Malaga Cove site is a stratified shell mound on a steep bluff overlooking the ocean near Redondo Beach in Los Angeles County. The archaeological deposit seems to cover a long time span and has been divided into 4 physical and cultural strata (Walker 1952). Level 1, distinguished by exceedingly small chipped stone tools ("microliths"), may represent the earliest coastal culture yet found. Milling stones are apparently absent in this stratum. It is in Level 2 that they appear. Levels 3 and 4 contain artifacts generally like those of later sea-front sites.

Level 2 also produced discoidal stones, rare mortars and pestles, pebble hammers, incised stones, reburials under cairns of stones, and the use of red ocher. Present also were soapstone objects, abalone shells plugged with asphaltum, and clamshell disks, traits generally regarded as somewhat later chronologically and lacking at Little Sycamore. The archaeological data are not full enough to permit comparative statements concerning such things as the frequency of bone artifacts and unmodified mammal remains. Shellfish valves apparently occurred in all strata.

La Jolla. The La Jolla complex (M. J. Rogers 1929, 1945; Harding 1951) is localized in the coastal belt of San Diego County with an extension southward into Lower California for an as yet undetermined distance. This assemblage remains to be clearly defined, culturally and chronologically, but some of its principal features are known. The sites are all shell middens and the prehistoric people generally selected beaches and saddles near sloughs and lagoons for their villages.

The artifact inventory includes basined milling stones, unshaped handstones, primary stone flakes, apparently scrapers, and possibly stone disks. The chipped stone tools, with rare exceptions, are made from waterworn beach pebbles flaked to give a cutting or chopping edge. A few large crude projectile points, some with convex, rounded bases, and scraper planes are included. Bone tools, if present, have not been described; mammal and bird bone in any form appears to be exceedingly scarce. A few purple olive shell beads with the spires ground off have been collected at one site. Unique are two perforated stone pendants which resemble charmstones, obtained in a recent excavation. Burials were made in the refuse deposit with graves often marked with one or more milling

stones. Corpses were flexed with the head to the north. Many of the skeletons are incomplete. This condition is generally attributed to discovery frequently having been made during house- and road-building operations, but the possibility of partial reburials cannot be overlooked.

The La Jolla culture has been divided into two phases (I and II) but the distinctions between the time periods appear to be rather minor. An absence of specific information regarding the numbers of artifacts as, for example, the percentage of grinding implements as compared with other classes makes precise correlation with Little Sycamore difficult, though there are many apparent resemblances. The predominance of flaked cobble tools, perhaps the outstanding La Jolla feature, is not repeated at the Ventura County site, though such implements occurred in reduced quantity.

Antiquity. It is obvious that all of the southern coast cultures described share certain features. That there are some divergences among them is also evident. The similarities in the various localities are of such a nature that they can, in the light of present knowledge, be logically explained only by postulating a historical connection. It is a little difficult to visualize the independent origin and development of such similar assemblages in adjacent areas and apparently on approximately the same time level. It seems reasonable to assume that they represent regionally varying phases of a simple and early food-gathering and -grinding pattern.

It is not easy to ascertain the antiquity of the assemblages. There are no radiocarbon dates for any southern Californian archaeological materials, and without reliable time-markers precise dating is impossible. There is no question of the sites being Pleistocene or even early Recent, as none has been found with convincing proof of a climate, fauna, or flora demonstrably different from that of the present. The suggestion that Oak Grove people resided in the Santa Barbara district during a period of greater rainfall (D. B. Rogers 1929: 344) awaits further proof. There are some points in favor of a respectable age, however. These include: (1) the general simplicity of form and manufacture of the artifacts; (2) the lack of association with later-type implements; (3) the extreme compaction as well as the observed alterations in the archaeological deposits; (4) the thick incrustation of calcareous material on artifacts and bones; and (5) the semimineralized condition of many of the human skeletons. Although none of these is a certain gauge of the passage of time, taken together they hint at some antiquity. The assignment of a point of time as early as 3000-2500 B.C., at least for the earliest habitation, does not seem unwarranted. This is definitely a guess-date, a rough approximation at best, but it probably falls somewhat near the real figure. It is doubtful that all of the industries are exactly coeval, beginning and terminating at the same time, though it is not possible to differentiate them temporally at this time.

The question whether the assemblages form a continuum with succeeding prehistoric phases has not been satisfactorily explored. A convincing chronological sequence has been developed only for the Santa Barbara region and here the Hunting culture which replaces Oak Grove is quite distinct though there are a few common traits. The La Jolla II phase is said to have merged with the later Diegueño, though this has not been demonstrated. The later sites in the coastal belt contain a much more abundant and elaborate inventory. Objects of shell, bone, steatite, and in the south, of pottery are found. The use of asphalt for many purposes is also characteristic. Mortars and pestles are the usual grinding devices though milling stones do not entirely disappear; projectile points are small, delicately chipped, and commonly of obsidian. The cultural gap between the ancient grinding-tool pattern and the later cultures seems a wide one at present but this may be closed as more evidence is gained concerning the sequence of development.

Other California Localities. Prehistoric industries containing milling stones have also been unearthed in the interior of California. Two sites at Buena Vista Lake (Wedel 1931: 103-4, 136) near the southern end of the San Joaquin Valley, produced these artifacts in their bottommost layers. The cemented deeper levels exhibited little else than mealing slabs and mullers (which occurred to a greater depth than any other class of artifacts), extended lime-incrusted burials, red ocher, perhaps the occasional presence of crude stemmed and leaf-shaped points, only an occasional bit of worked bone, and one example each of mortar and

pestle. The striking resemblance to Oak Grove (Wedel 1931: 147) has been noted.

Early horizon settlements of the lower Sacramento Valley have also produced milling stones (Heizer 1949: 20). They are few in number, however, as only three grinding slabs have been found. No distinctly recognizable handstones have been found, though several round flattened pebbles which could have served this purpose were secured. The grinding implements occurred in association with a much more elaborate and seemingly less ancient tool assemblage. Orr places Oak Grove at a chronologically earlier date than Early horizon Sacramento (1943: 3; 1952: 217) as do Heizer and Fenenga (1939: 395-6). A radiocarbon date for an Early horizon settlement is 4053 ± 160 B.P. (Libby 1952: 84) or roughly 2000 B.C. In contrast to the coastal complexes the workmanship of Early horizon artifacts is of high order.

Milling stones were obtained in some numbers from the lower levels of the controversial Borax Lake site in Lake County, north of San Francisco Bay (Harrington 1948b: 110-3). In several other respects the Borax Lake complex correlates with Little Sycamore. Of the chipped stone tools, simple and undifferentiated scrapers, choppers, and drills are shared. The wide range of Borax Lake projectile forms is not duplicated at the Ventura County site though at least one form, the convex, rounded-base variety, is shared. The fair quantity of mills and mullers, few mortars and pestles, a practical absence of bone tools, and artificial rock piles are also mutually held traits. A specific resemblance lies in the coarse, unperforated charmstones with one form identical at both localities. There are no data on the disposal of the dead for the Lake County site, as only two scraps of possibly human bone were turned up. Though the Borax Lake cultural remains, namely the numerous projectile tips and blades, suggest some emphasis on hunting, animal bones of any type are scarce. Other than recent intrusives such as burrowing rodents, the mammal remains appear to be those of large creatures such as deer or elk. Vegetal foods must have been important items in the diet of the early people. The Borax Lake archaeological deposit, though darker than the surrounding soil, has been greatly altered and is much more compacted than the soil of more recent sites in the same district. The cultural and historical position of the artifact complex is not clear. The late Pluvial age assigned to it (Harrington 1948b: 123) seems to be excessive. Recent attempts to describe it as a manifestation of the Central Californian Middle horizon (Krieger 1953: 240-1) would also seem to be in error. The Borax Lake complex and the Middle horizon culture, although they include a few similar traits, are not at all alike in their general patterns and each shows distinctive traits not present in the other. Though there are definite resemblances between the materials recovered at Borax Lake and those from Little Sycamore it would be premature and unwise at the present state of knowledge to suggest more than the possibility of a genetic relationship. The spatial separation of the two localities and the observed differences in their artifactual assemblages do not permit going any further. The locating of a similar ancient site geographically intermediate between the two would strengthen the case for cultural linkage.

From the interior desert region of southern California has come archaeological evidence of several human occupations older than those of the recent Indians or their immediate ancestors. Of these, the Pinto Basin materials from northern Riverside County (Campbell and Campbell 1935: 33-4) and the Little Lake (Stahl) site in Inyo County near the southern end of Owens Lake (Harrington 1948a) include milling stones and mullers. While a few other types of stone implements, including leaf-shaped, round-based points, are common to the interior and coast, specific analogies are lacking. The relative abundance of projectile points in the desert camps contrasts with their scarcity in the early littoral sites. The diagnostic Pinto Type Point has not been found in the latter deposits.

Localities Outside of California. The possibility of an interconnection between the California milling stone complexes and those of the Southwest has been suggested or at least considered a number of times (Sayles and Antevs, 1941: 30; Gladwin 1937: 34, map 2; Treganza and Malamud 1950: 151; Sauer 1945: 1-25; Macgowan 1950: 126-9). There is a general likeness to the Cochise industry of southeastern Arizona (Sayles and Antevs 1941), particularly to the Chiricahua stage. This is evident not only in grinding devices but in several classes of chipped stone tools as well. The recently defined Chiricahua-Amargosa II complex of

Ventana Cave (Haury 1950: 339-40) exhibits many of the same features. The correspondences appear to imply a basic cultural relationship rather than merely reflect a superficial resemblance, but more specific evidence is needed. The major linking criteria — the possession of milling and handstones and an economy relying to a considerable extent upon wild seed collecting — are generalized traits and in order to establish a definite and convincing cultural-historical linkage it will be necessary to detect additional common elements and perhaps some of a more specific nature. Again the recovery of analogous archaeological remains in the intervening district would strengthen the argument for a tie-up.

Summary and Conclusions. The recent excavations at the Little Sycamore site have produced evidence of an early artifact assemblage, which fits within the framework of a simple cultural type with a food-collecting economy and distinguished by the extensive employment of milling stones. This cultural type appears to have been distributed along the coast of California from north of Santa Barbara to the Mexican border and beyond. Though regional manifestations of it are by no means homogeneous they do show a fairly high degree of correlation. In all localities key traits may be observed: a dominance of milling stones and mullers; projectile points characteristically large and often unnotched and convex-based; crude chipped artifacts from cores or heavy flakes; a scarcity of bone and shell items; few mammal bones in refuse accumulations; burials under heaped-up stones, often inverted grinding slabs; and burial offerings seldom abundant and frequently absent. The present evidence, which is by no measure satisfactory, suggests that they share a common heritage.

This culture has not manifested itself along the Pacific shore very far north of the Santa Barbara area. Archaeological investigations in the coastal tract between Santa Barbara and San Francisco Bay have been few in number and the distribution may be pushed farther as more work is done in this area. A corresponding complex has been noted across the coastal ranges at Buena Vista Lake in the San Joaquin Valley. To date this unspecialized milling-stone assemblage has not been reported for the Sacramento Valley though Early horizon settlements contain elements which may represent carry-overs from such an ancient substratum. If present, its remains may be covered with many feet of alluvium left by flood waters, as the seemingly more recent Early horizon sites are often buried under three or four feet of river-deposited sediment. The Borax Lake site north of San Francisco Bay appears to show trait affinities to the Little Sycamore and other similar manifestations.

The relationship between the coastal complexes and the early desert cultures of southern California is not clear. Perhaps some interconnection does exist though this is not presently evident. Possible broader cultural-historical linkages to the Cochise and Cochise-like cultures of the Southwest have been suggested but until more evidence can be brought to bear this cannot be assumed.

The focus from which the Pacific Coast assemblages, or individual traits belonging to them, was derived and the routes by which they traveled are unknown. That they represent an autochthonous coastal development is a possibility, as is a spread seaward from the interior of California. A dispersal from the Southwest is equally conceivable. The Cochise culture because of its generalized character during the earliest stages and its apparently greater antiquity is a likely parent stock. The imputed antiquity of the Cochise stages (Sayles and Antevs 1941: 55: Sulphur Springs more than 10,000 years old; the Chiricahua about 6000; and the San Pedro between 5000 and 3000 years) is now generally regarded as too high. Radiocarbon analyses have reduced each of these dates by several thousands of years (Libby 1952: 84-5). If this Cochise origin is correct, it might be assumed that the almost exclusively seed-gathering Oak Grove, Topanga, and early Buena Vista Lake complexes represent a somewhat earlier phase than the seafood and seed-collecting Little Sycamore, Malaga Cove, and La Jolla manifestations. It is of interest that the first three share the practice of extended burial. This may represent an ancient mortuary custom which persisted to a somewhat later date in the lower Sacramento Valley where it is the typical method of disposal in Early horizon settlements. If the ancestral culture possessed a wild plant gathering economy, it can be adduced that a certain lapse of time would be necessary for an adaptation to and extensive utilization of a new food resource, the abundant shell life. The blending of a seed-gathering mode of subsistence with an

already existing shellfish-gathering one is also plausible. Whether the basic traits of this early culture were migration-borne or were spread by the generally slower process of diffusion from group to group is not known. The fact that approximately the same elements occur together on a comparable time level presumably indicates that they represent a complex which spread as a unit, perhaps carried by a migrating people.

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UNIVERSITY OF SOUTHERN CALIFORNIA
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COX, AN ARCHAIC SITE IN THE OZARKS

MARVIN E. TONG, JR.

PROPOSED CONSTRUCTION of Table Rock Dam and Reservoir on White River in southwestern Missouri threatens with destruction a vast region of unique and important archaeological remains in the rugged Ozarks region. Every indication of prehistoric life both within the actual reservoir area and its perimeter is of extreme importance in reconstructing human activities of the region in ages past. Because of its geographical location, the Ozarks region is most promising from an archaeological standpoint. Bounded on the east by the Mississippi River, on the north by the Missouri River, and on the west by the Great Plains, the Ozarks were probably in prehistoric times a melting pot for a great many cultural traditions. The Ozark Bluff Dweller culture, with its apparent early agriculture, is only one of the many problems that need a great amount of additional work within this area. Recent investigations by the University of Missouri indicate that the history of man within the Ozarks may very well go back to a time comparable with some of the earliest occupations of the Great Plains. In addition, evidence is steadily accumulating toward a rather heavy occupation in prehistoric times of a tradition very similar to the Eastern Archaic pattern. Work on this phase of archaeology in the Ozarks region can be of tremendous importance to the entire picture of Midwestern archaeology, as well as solve many of the problems posed by the scanty picture of the Ozark Bluff Dwellers and their agriculture.

It is the purpose of this brief paper to call attention to the materiel from one of the many hundreds of sites throughout the Ozarks that appear to have a connection with the Eastern Archaic pattern. Although this report is based only upon the findings of surface surveys, it is believed that every site reported upon from the Ozarks can play a part in painting the eventual picture of prehistoric man within this picturesque hill country.

Although the Cox site is not within the Table Rock Reservoir area, it does lie a few miles upstream from the James River arm of the proposed lake, and therefore is an indication of human occupation within the region to be inundated. Grateful acknowledgment is made to Ernest Anderson, owner of the site, for his permission to conduct the survey, and to Mrs. Ettie Cox, of Marionville, Missouri, who first called attention of the site to the writer. The site is named in her honor. The artifacts that form the basis of this report were collected from the site over a period of many years by both Mrs. Cox and Mr. Anderson, who graciously turned them over to the writer for study and illustrative purposes. The site has been surveyed a number of times by the writer as a check upon the material previously collected. Artifacts from these later surveys are incorporated into the Anderson and Cox collections.

The Cox site is located on the left bank of Crane Creek approximately one mile above the confluence with James River. The site covers some 4 to 5 acres along a well-developed second terrace of Crane Creek, and is sheltered from all directions by typical high Ozark hills. Soil on the site is alluvial in origin, and is comparatively free of rock. Most stone on the site appears to have been carried there by the prehistoric inhabitants. Although the site is well above the present channel of the creek, Mr. Anderson recalls several times in the past when a combined flood on Crane Creek and James River resulted in part of the site being inundated for a short period. Most of the site is in pasture, and does not appear to be eroded.

The surface of the Cox site shows a great abundance of prehistoric industry, principally through chips, flakes, spalls, projectile points, knives, scrapers, hammerstones, pestles, and manos. The writer has not found evidence of bone or pottery on the site, and neither Mr. Anderson nor Mrs. Cox recall seeing ceramic material from the village site.

TABLE 3. ARTIFACT INVENTORY OF THE COX SITE

Chipped Flint Artifacts:

I. Projectile Points	
A. Stemmed points	
1. Subtype 1	76
2. Subtype 2	37
3. Subtype 3	8
4. Subtype 4	15
B. Triangular Points	12
C. Side-notched Points	23
D. Corner-removed Points	81
E. Corner-notched Points	66

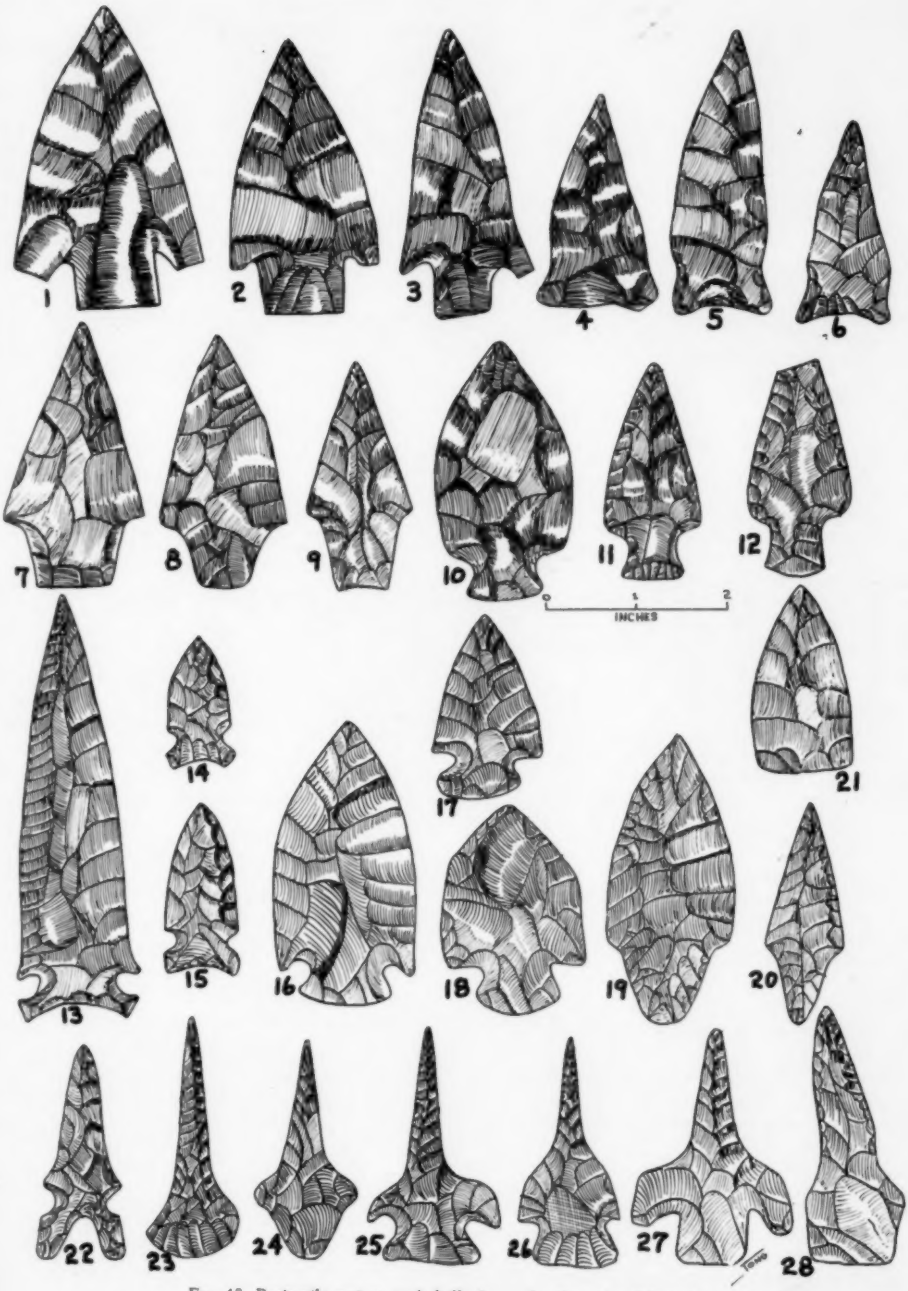

FIG. 43. Projectile points and drills from the Cox site, Missouri.

II. Knives
  A. Round Base 12
  B. Square Base 9
III. Drills
  A. Winged or Hafted 3
  B. Square Base 2
  C. Flaring Base 4
IV. Scrapers
  A. Small oval thumb scrapers 5
  B. Large oval scrapers or blades 17
V. Axes: Double-bitted 2

Pecked and Ground Stone Artifacts:
I. Axes: full-grooved 1
II. Grinding Basins
  A. Mortars 1
  B. Metates 1

Projectile points from the site are manufactured by both percussion and pressure flaking from chert material common to the Stone County region. A few quartzite artifacts are noticed from the village site, but objects of this stone are far more common in the regions east of the James River watershed. Projectile point types from the site include straight-stemmed, side-notched, corner-notched, corner-removed, and triangular. Generally speaking, workmanship exhibited at the site is good to excellent. Marked by their absence from the Cox site collections are the small arrowpoints found abundantly in late manifestations throughout the Ozarks region.

Stemmed Points

Subtype 1. This projectile point has a straight stem with a flat base. The edge of the blade is in most specimens gently convex from the point, ending in massive barbs. Chipping is percussion only. This is one of the most abundant types from the site with 76 specimens being represented (Fig. 43, *1-3*).

Subtype 2. Basically lozenge shaped with the stem contracting toward the base, this point in all cases has either a flat or very slightly concave base. Although percussion chipping is used exclusively, it is generally well executed. The upper sides of the stem flare out to form a definite shoulder from which the edge of the blade is carried in a straight line to the tip. Occasionally a specimen of this type exhibits basal grinding (Fig. 43, *7-9*).

Subtype 3. Although the general shape of this group is very similar to Subtype 2, two features of this category, in the writer's opinion, warrant a different classification, namely, the rounded base and the convex sides of the blade. In addition, the percussion flaking of this group is carefully overlaid by pressure chipping, resulting in an exceptionally well-made artifact (Fig. 43, *19-20*).

Subtype 4. This group, which appears to be unique to the Ozarks region, is an expanding-stem form with convex base and rounded shoulders. Chipping, by both percussion and pressure, is generally well executed and the material from which these points are manufactured is of far better quality than normal for this section. Another important distinguishing feature is the edge grinding around the entire stem and base (Fig. 43, *10-12*).

Triangular Points. These specimens are manufactured by percussion flaking with slight pressure chipping near the base to form shallow concavities or side notches apparently utilized for hafting. The form of the blade is not well executed, giving the appearance that the manufacturer followed the natural faulty cleavage of the flint in producing these artifacts. The base in this group is flat, with occasionally a specimen with a very slight concave base (Fig. 43, *4-6*).

Side-notched Points. The side-notched points from the Cox site are of excellent workmanship, although they are quite thick through the cross section of the blade, giving a stubby appearance. The base is always concave and most exhibit basal grinding. The blade curves rather abruptly to the tip (Fig. 43, *14-15*). One specimen (Fig. 43, *13*) is completely out of context with the balance of the sample even though it falls into the side-notched category. Heroic in size, this example has the finest workmanship the writer has observed from the Ozarks region. The blade is beveled to the left through the use of remarkably well controlled pressure flaking. The notches and concave base are carefully ground smooth. Just above the notches the blade curves outward sharply to give the appearance of barbs. Material utilized for this point (it could just as easily be a knife) is glossy, white, fine-grained flint. This type of material is usually found in the Ozarks region only in projectile points that appear to have considerable antiquity. A study of distribution of this type should prove most fruitful, as would research into the source of this extremely workable material.

Corner-removed Points. This category (Fig. 44, *11-13*) is the most abundant from the Cox site with 81 specimens represented. The blade is wide for the length of the point. The stem is slightly expanding toward the base, which is usually flat or very slightly convex. Shoulders and stem appear to have been formed by the removal of the corners of a basically triangularly-shaped wide blade. Chipping is primarily percussion with some pressure flaking along the blade edge.

Corner-notched Points. Although similar in general outline to the category above, these specimens have a definite convex base and expanding stem. In addition, the barbs are well defined as a result of the basic blade being notched directly in from the corner. Percussion flaking appears to be the principal method of manufacture (Fig. 43, *16-18*). A single specimen of the corner-notched variety (Fig. 44, *14*) has a concave base, an extremely sharp tip, and is finished throughout with finely-executed pressure flaking. This specimen, unlike the other corner-notched types which are made from a white or tan chert, is executed in a gray-black

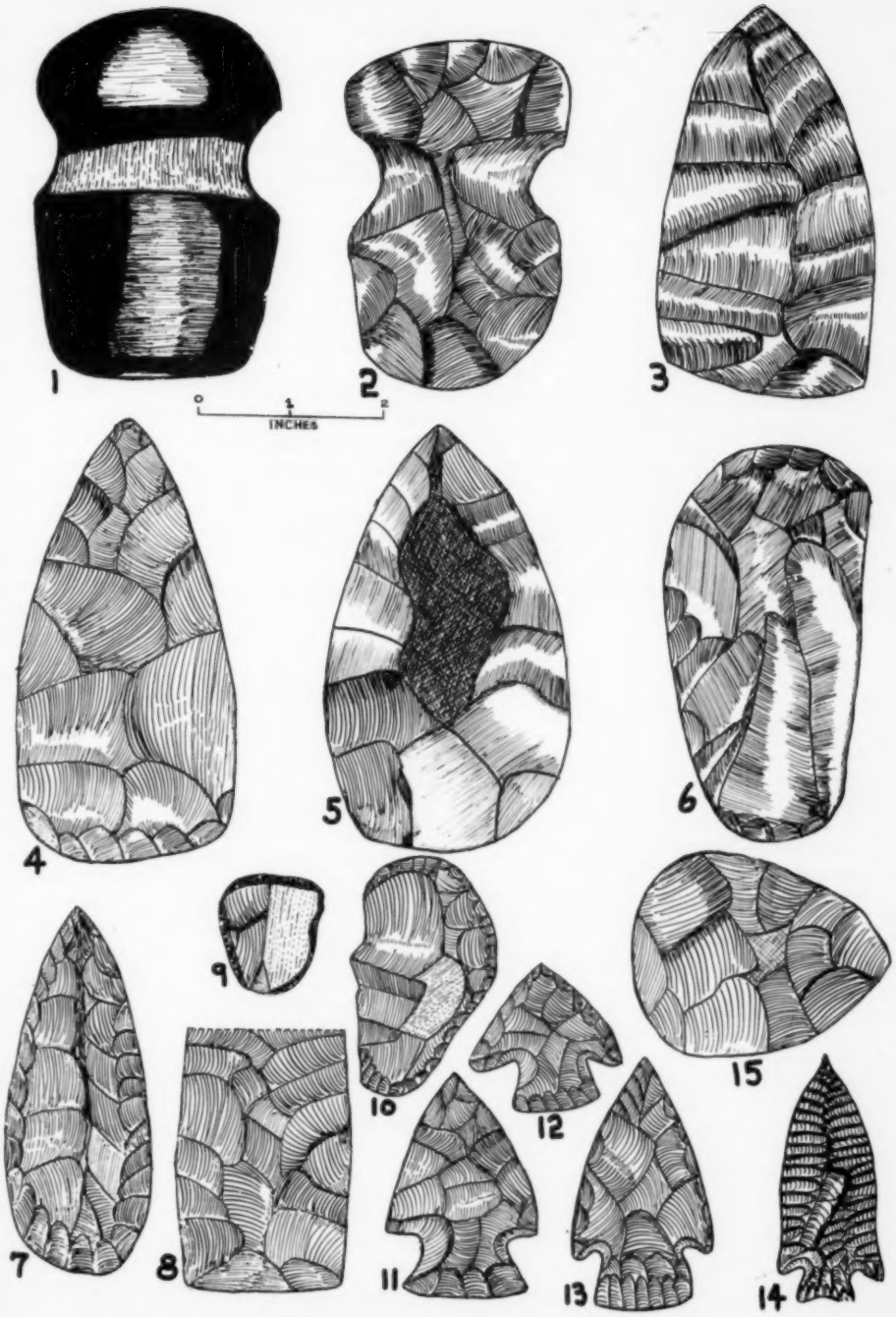

FIG. 44. Stone artifacts from the Cox site, Missouri.

flint that is common to the Flat Creek watershed southwest some 20 miles from the Cox site.

Knives. Two types of knifelike forms are present in the Cox site collections. One type has a flat base, while the other style is marked by a pronounced round base. Generally, the round-based specimens are smaller in size. Whether both styles are true knives, or served some other purpose, is not certain; this writer would identify them as knives because of general appearance (Fig. 44, *7-8*).

Drills. A wide variety of drill forms comes from this site (Fig. 43, *22-28*). These tools fall into 3 categories: winged or hafted, square base, and flaring base. In the accompanying illustration it is evident that 5 of the specimens have apparently been reworked from the various projectile point styles previously described. One example (Fig. 43, *22*) is unique and in classification it was a question as to whether it went into the drill group or was actually a projectile point. However, because of the diamond-shaped blade with evidence of wear on the edges, it was tentatively placed with the drills.

Scrapers. These utilitarian artifacts from the site are much less abundant than projectile points. Two types of scrapers are identified: small oval thumb scrapers with a carefully chipped edge, and large oval scrapers or blades that appear to have been hafted (Fig. 44, *3-6, 9-10, 15*).

Chipped Flint Axe. Two specimens of chipped flint axes were recovered from this survey. Both are examples of percussion chipping, and bear evidence of wear where the tool was hafted (Fig. 44, *2*).

Ground Stone Axe. One ground stone axe was found (Fig. 44, *1*). It is of the full-grooved variety and was formed by pecking and polishing. The material is limestone, a rock commonly used for ground stone axes further south along White River.

Hammerstones. Two types of hammerstones are found on this site. One is of battered flint, the other of sandstone. This latter type usually exhibits pecked finger holds on both sides.

Mortars. One mortar has been found on this site. It is of fine-grained sandstone with a round depression pecked and ground into one side. This specimen is 18 inches long, 14 inches wide and some 4 inches thick. The depression is 2 inches deep. Several bun-shaped sandstone pestles found on the site were probably used with this type of grinding basin.

Metates. A sandstone metate was ploughed up several years ago on the site by Mr. Anderson. It is of the deep parallel-sided trough type with closed ends. The basin is about 3 inches deep. Overall length is 24 inches, width 14 inches, thickness 7 inches. Two narrow oval manos were also collected from the site.

Comparisons. The wide variety of projectile point types from the Cox site makes for difficult comparison because of regional variance in both technique and form. However, a number of similarities can be shown between specimens from the Cox site and other areas. One of the more pronounced agreements in form is from Graham Cave in Montgomery County, Missouri, some 200 miles north. This site, an Archaic manifestation, has produced a wide variety of projectile point types. Subtypes 1, 2, and 4 of the stemmed points from the Cox site are also reported from Graham Cave, as well as the side-notched, corner-notched, and corner-removed points (Logan 1952: 28-9, 88). In addition, blade forms or large oval scrapers from the Cox site compare favorably with Graham Cave material (Logan 1952: 92).

Stemmed points of subtype 3 from Cox are very similar to points recovered by University of Missouri archaeologists in the excavations of Rice Shelter on White River some 35 miles southwest of the Cox site. These points from Rice Shelter extended from the lowest levels to fairly late times (Marshall, *et al* 1953: 8-11). Another very close similarity is between the projectile points from the Cox site and preceramic horizons of northeastern Oklahoma. Subtype 4 of the stemmed points from Cox compare most favorably with type C found in the Oklahoma investigations (Baerreis 1951: 37). Other close similarities are between subtypes 1, 2, and 3 from the Cox site and types A1, B1, B2, B3, and H found in the Oklahoma preceramic sites (Baerreis 1951: 110). Subtype 2 of the Cox stemmed points, as well as the triangular points, corner-notched, and corner-removed points appear to be closely related to artifacts excavated at the Cave Hollow site in Arkansas, which is reported to be an Ozark Bluff Dweller site (Miner 1950: 6).

Subtypes 1 and 2 of the stemmed points from Cox share traits with those of the Titterington focus of the Archaic pattern in the St. Louis area. Also found at both the Cox site and in the Titterington focus are side-notched points, corner-notched points, square-based drills, triangular points, and full-grooved stone axes (Griffin 1952, Fig. 67). Another comparison is side-notched points from Cox with similar artifacts from the second level of Hidden Valley Shelter in Missouri (Chapman 1948: 140-2), and from the Tecumseh site in Ozark County, Missouri (Tong 1951: 24). The full-grooved ground stone axe is found in almost

all manifestations of the Eastern Archaic tradition, as well as in many Early Woodland aspects (Griffin 1952, Figs. 21, 29, 69, and 96; Webb and DeJarnette 1948: 62).

The sandstone mortar, such as found at the Cox site, is a trait fairly widespread in both time and space throughout much of the United States, and, therefore, is not a particularly strong indicator of a cultural pattern. The metate from the Cox site, a trait more limited in distribution (as far as we know now), appears to be very similar to those reported in the Turkey Bluff focus of the Fulton aspect (Lehmer 1952: 315 and Fig. 99). A very interesting number of metates, some open at one end like those of the Southwest, are showing up now in the Ozarks region as the archaeology becomes better known. However, the place of this trait in both time and tradition in the Ozarks must await further research along that line, as well as publication of the results of University of Missouri excavations in the stratified deposits at Rice Shelter on White River.

Summary and Conclusions. From the limited material available now from the Cox site, it appears that the prehistoric aborigines that used this village were primarily hunters and gatherers, depending upon wild game, nuts, and seeds for their subsistence. No indication of agricultural practices can be found in the surface collections. Also, it is probable that these people had no knowledge of the bow and arrow, but rather used darts or spears for their principal weapon.

Drawing conclusions from such limited research can at best be only tentative. It is very possible that the Cox site was used over a time span by more than one group of prehistoric peoples, and that different cultural traits are expressed in the surface collections from the site. However, it does appear to the writer that the predominant traits exhibited by this material follow very closely the characteristics of the now more clearly defined Eastern Archaic pattern. The widely varying projectile point types from the Cox site are typologically similar to those of the Archaic tradition, and also seem to be indicative of the vast elaboration expressed in stone by these early aborigines. Whether or not the Cox site can show selectivity in style of stone work through time is a problem that can only be illuminated by scientific excavation.

At the present time, the Cox site is not threatened with inundation by government reservoirs, and at some more favorable time its careful excavation could prove an important addition to the cultural knowledge now being salvaged by the University of Missouri in the upper White River region.

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POPULATION CENTERS OF THE RIMAC VALLEY OF PERU

LOUIS M. STUMER

THIS ARTICLE is intended less as a descriptive piece on the archaeology of the Rimac Valley than it is as a single-valley application of various conclusions reached by Richard P. Schaedel in his *Major Ceremonial and Population Centers in Northern Peru* (1951). Schaedel, in a broad synthetic study of major ruins on the North Coast of Peru, comes to several interesting conclusions on the "urban revolution" in that region. The author, who was already engaged in a survey of the Rimac, with the focus on the coastal cultures from sea level to the 1000-meter line, felt impelled to shift the emphasis of his survey from straight description to a Central Coast application of Schaedel's North Coast findings. This was a fairly easy task, as the sites were already being analyzed both architecturally and ceramically.

The Rimac, the "valley of Lima," presents sufficient of both typical and atypical features of a Peruvian coastal valley to make the application of Schaedel's theories to a single valley at least fairly indicative of their validity for the entire Peruvian coast. The pattern for the Sierra must await both a synthetic study of major sites and a further detailed regional study as well. It is to be hoped that this will be possible in the near future, since it could well serve to shed further light on several aspects of Coast-Sierra relationships which are at present troubling Peruvianists.

In this work, the author has endeavored to include his original listing of Rimac sites and the surface ceramics to be found at each, while correlating such descriptive material with the purpose stated above. Some six months were spent in the field, although not consecutively, and all existing sites mentioned in available literature were personally visited and checked. Various discrepancies in this literature and the accompanying maps came to light, as well as hitherto unlisted sites (see Fig. 45). In addition, certain sites, particularly some of those mentioned in the accounts of Middendorf (1894) and Uhle (1910), are no longer available for detailed study, due to the unavoidable encroachments of time and the extension of the urban and suburban areas of modern Lima.

Since the scope of this study was limited to coastal sites, highland centers were not examined in detail. However, the author has tried to define the line of demarcation between mainly pure coastal centers and those pertaining mainly to the cultures of the Ceja de la Sierra (the western slopes of the Maritime Cordillera), such as those described by Hrdlička (1914). In the Rimac, this demarcation occurs at approximately the 1000-meter line, which in this valley is near Kilometer 42 of the Carretera Central between Lima and La Oroya, some 50 km. from the sea. The previously mentioned 1000-meter line has turned out to be the approximate limit of coastal sites in most of the valleys studied by the author such as the Huaura, Chillón, Mala, and Chancay; and Schaedel has found that this rough division is also true of valleys studied by him on the North Coast (personal communication, 1952).

The Rimac is a valley of 23,000 square hectares of irrigable land, making it one of the larger valleys of the Central Coast. It would appear that there has been no great change in the amount of land under cultivation since preconquest times. Naturally, the city of Lima and its environs have taken up a great deal of land previously devoted to crop raising in prehistoric times, but taking this into consideration, there is otherwise no evidence of major hydrological shifts between past and present.

The valley is distinguished by a large, for Peru, coastal plain which merges imperceptibly with the coastal plain of the Chillón valley on the north, and on the south is separated from the mouth of the Lurín valley by only a narrow strip of desert land, called the Tablada de Lurín, scarcely 5 km. wide at its seaward end, and showing signs of having been a part of an irrigated three-valley complex in preconquest times (Chillón-Rimac-Lurín). This coastal plain extends some 20 km. eastward from the sea coast, at which point it terminates in various rocky spurs of the coastal Andes. Up to this point, the north bank of the Rimac contains practically no area whatsoever, as the Chillón here parallels it, and reaches the sea only some 7 km. north of the Rimac's mouth, and the configuration of the low coastal hills places practically all of the plain north of the river itself in the Chillón drainage. East

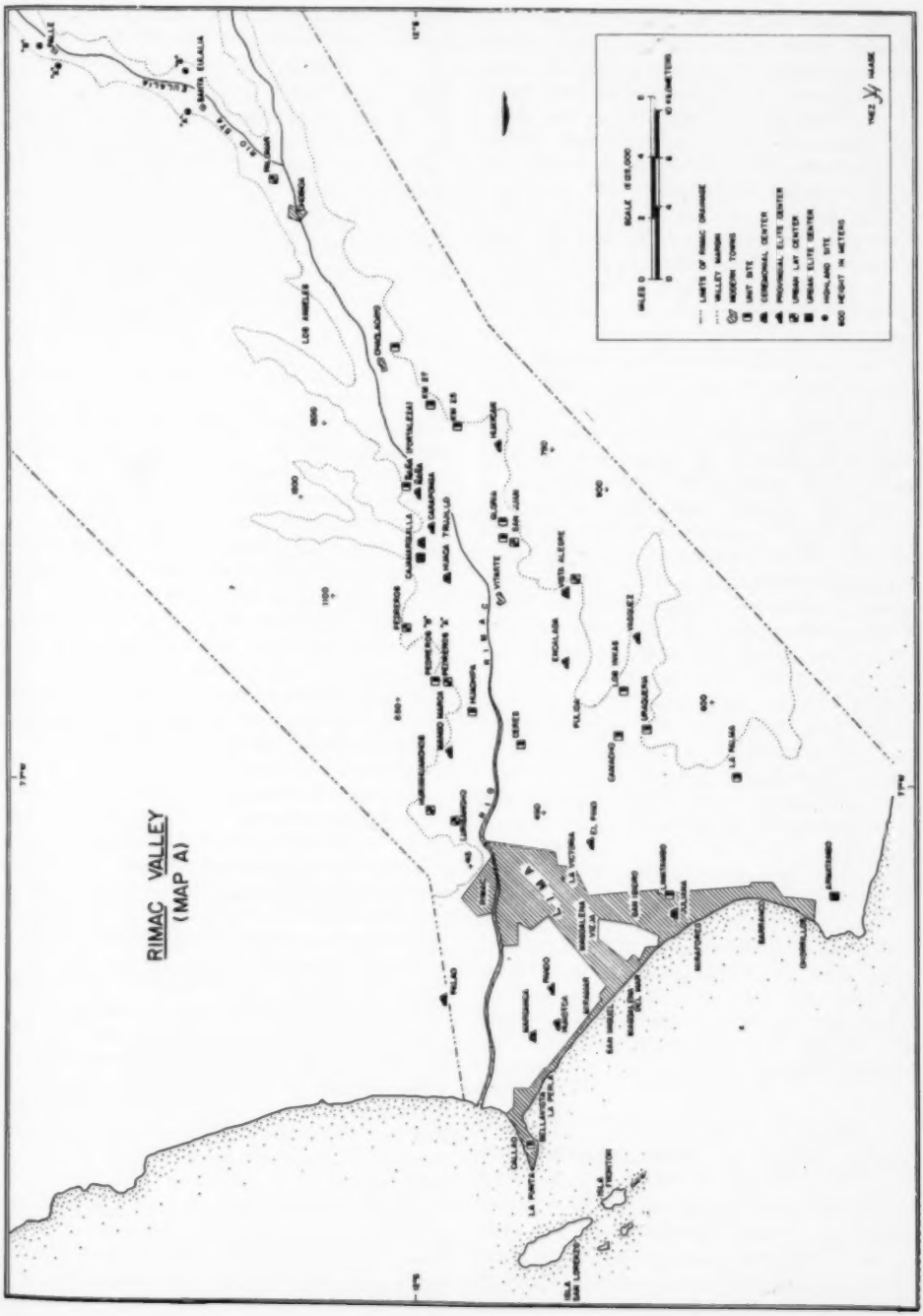
RIMAC VALLEY
(MAP A)
SCALE 1:25,000
MILES 0
KILOMETERS
LIMITS OF RIMAC DRAINAGE
VALLEY MARGIN
MODERN TOWNS
UNIT SITE
CEREMONIAL CENTER
PROVINCIAL ELITE CENTER
URBAN LAY CENTER
URBAN ELITE CENTER
HIGHLAND SITE
500 HEIGHT IN METERS
TAKE Y/ MAGNE
LIMA
CALLAO
LA PUNTA
BELLAVISTA
LA PERLA
LA VICTORIA
MAGDALENA VIEJA
SAN MIGUEL
MAGDALENA NUEVA
PUEBLO LIBRE
MIRAFLORES
BARRANCO
SURQUILLO
SURCO
CHORRILLOS
LURIN
PACHACAMAC
CARABAYLLO
COMAS
PUENTE PIEDRA
ANCON
SANTA ROSA
LOS OLIVOS
SAN MARTIN DE PORRES
INDEPENDENCIA
CALLAO
LA PUNTA
BELLAVISTA
LA PERLA
ISLA FRONTON
ISLA SAN LORENZO

FIG. 45.

of the beginning of the Andes foothills, the Chillón curves to the northeast, and several large *quebradas* (dry canyons), such as those of Lurigancho and Cajamarquilla, are found on the Rimac's north bank before the valley neck, which is located approximately 30 km. from the sea. The south bank, however, contains the broad expanse of plain mentioned above which extends some 23 km. to the south of the river, ending beyond the ruins of Armatambo, within sight of the Temple of the Sun at Pachacamac. In addition, the large La Molina-Vasquez quebrada is found on the south bank east of the El Pino-Monterico hills.

From the neck of the valley, the river flows nearly northeast-southwest, and coastal sites line its fringes for another 18 km. Here are found such Inca sites as Ñaña, guarding the passage from Lima to the Sierra, and important centers such as Huaycán with its extensive living and fortress area. Beyond Chosica, located some 40 km. from Lima, the valley becomes extremely narrow and precipitous; the architecture changes from adobes and/or tapia (a poured adobe) to stone; ceramics are found of typical Sierra paste; and coast characteristics disappear to be replaced by those of the crude cultures of the Ceja de la Sierra.

Before proceeding further, it would seem advisable to define here the classification of sites used by Schaedel and in the present work. One of the author's categories has not been used by Schaedel, as he was dealing only with *major* population centers. In making a detailed study of every site, except those containing only one or two preconquest houses, it was found necessary to create a category which would best describe small living clusters, garrison points, and other sites too small to be properly included in the site classifications listed below. For these, the term *Unit Site* has been used, since these are almost exclusively village units or individual, nonceremonial structures. The remaining categories, as defined by Schaedel are:

1. The *Ceremonial Center*. One or several pyramid-temples, or *huacas*, sometimes with some minor construction in the vicinity, which may have served as living quarters for a limited population. (Schaedel says, "*usually* with some minor construction . . . ," but since these centers in the Rimac are frequently disturbed by subsequent building or irrigation, the author feels it best here to substitute *sometimes* for *usually* in the interests of exactitude.)

2. The *Urban Elite Center*. The most extensive and impressive type of site, characterized by a series of large walled compounds and terraced buildings with complicated internal subdivisions, as well as numerous minor structures, cemeteries, etc.

3. The *Urban Lay Center*. These are composed of extensive and/or dense accumulations of house foundations, refuse deposits, etc., with occasional structures of high grade construction, but generally inferior to the architectural elegance of the urban elite center.

4. The *Provincial Elite Center*. A small to medium planned site; sometimes of no little elegance, quite often ingeniously adapted to its geographical setting. These sites are usually a combination of small-scale urban and important defensive features, giving the impression of long and well occupied garrison and living sites. They have neither the extensive elegance of the urban elite nor the sprawling extent of the urban lay centers.

5. The *Highland Site*. A self-explanatory term, used to define sites of noncoastal cultures, whatever their urban characteristics.

These, then, are the site categories which, with the one exception, Schaedel established in his northern survey, and which we will consider here.

The major *Ceremonial Centers* of the Rimac are: Juliana, located in the heart of the modern, residential San Isidro-Miraflores area of Lima, and consequently in very bad shape archaeologically; Maranga, excavated by Jijón y Caamaño (1949) and Kroeber (1954), located roughly midway between Lima and its nearby port of Callao; and Vista Alegre, the best preserved of the three, which can be seen at the head of a fertile quebrada on the south bank of the valley some 12 km. east of Lima just before entering the little town of Vitarte. Vista Alegre has not yet been excavated scientifically, but the author plans such excavation in 1954 as the third of a series, the first two of which, Playa Grande and Marquez, were completed in 1952 and 1953.

Other ceremonial centers are Cajamarquilla and the Huaca Trujillo. These are located some 2 km. from each other in the Cajamarquilla quebrada on the Hacienda Nievería about 17 km. east of Lima. They are on the

river's north bank. The Huaca Trujillo is of rather modest size, in miserable condition, and is considered by the author to have been the earliest formal occupational center of the Cajamarquilla area. The ruins of Cajamarquilla itself have been illustrated and described too often to warrant further description here. Suffice it to say that their extent is enormous. However, the ceremonial center (Fig. 48, *a*) contained therein does not justify, by either size or complexity, the label of "major." The remainder of the ruins pertains to later periods and are those of an urban elite center.

The ceremonial centers of the Rimac can be distinguished by their large, stepped, central pyramid and by the use of courses of innumerable small, rectangular, hand- and mold-made adobe bricks. The use of tapia, with the exception of Vista Alegre, is subsidiary, the main constructions being of adobes. At Vista Alegre the reverse is true; the main construction is tapia and the small adobes are incidental.

The Huaca Trujillo is an isolated ceremonial pyramid, but there are evidences of minor, related constructions in the immediate vicinity. The complete, original ceremonial extent of Juliana and Cajamarquilla is indistinguishable because of modern and ancient building incursions, respectively. However, the pyramid of Juliana is most similar to those of Maranga and Vista Alegre, which are large huaca complexes. Maranga is comprised of some twelve large and medium-sized pyramid mounds, while Vista Alegre's massive, ramped central pyramid is surrounded by five smaller, subsidiary huacas. The existing evidence is faint, but when reference is had to it, plus that of similar ruins in the Lurín (Pachacamac) and the Chillón (Cerro Culebra), the conclusion must be that the main structures, at any rate, of the ceremonial centers were highly colorful, making use of extensive wall paintings. Perhaps the Vista Alegre excavations may shed more light on just what kind of wall paintings was favored, as the central pyramid there has suffered comparatively little from the depredations of *huaqueros* (grave robbers), although terraces containing groups of graves and outlying areas have been fairly thoroughly ransacked. Fortunately for archaeologists, however, the Central Coast huaquero does not exhibit the ingenuity, knowledge, persistence, and thoroughness of his North and South Coast brethren who have made a tremendous dent, both literally and figuratively, in the existing remains of the Mochica and Nazca cultures. Even in areas where he has been most active, the location of graves that he has overlooked is not a major task.

The character of the ceramics associated with these ceremonial centers is, in the main, such as to leave little or no doubt of the pre-Tiahuanaco nature of most of them. At Maranga and Vista Alegre the author has found sherds atop the principal structures or upon important terraces that are of the classic Tiahuanacoid I style (Bennett and Bird 1949, Fig. 40, *upper half*), but such sherds are absent at the other sites. At Cajamarquilla the sherds of the Maranga 3 type almost invariably exhibit the Tiahuanacoid I influence; however, the general run of surface sherds and all those from the lower levels at ceremonial sites are pre-Tiahuanacoid in all instances. It is felt that these centers, with the exception, perhaps, of Cajamarquilla, were built and attained their highest development and importance during the Formative and Regional Florescent epochs. Jijón illustrates (1949 Pl. 21, *1, 2, 4*) sherds from Maranga which he does not classify as Tiahuanacoid I, yet these sherds, when compared to some from Ancón Necropolis (Strong 1925, Pl. 46, *c, f, g, n, o*) and from the Supe Valley (Kroeber 1925b, Pls. 73, *d*; 74, *l*) as well as complete vessels from Cajamarquilla (Gayton 1927, Pls. 91, *b*; 94, *f*; 95, *f*) and Pachacamac (Doering 1952, Pl. 94; Gayton 1927, Pl. 97, *f*), would seem unmistakably to be of this style. Combined with the considerable number of such sherds encountered by the author, it is felt that there is now sufficient evidence to assume a terminal Tiahuanacoid I character for the continuous occupation of Maranga. There are, of course, intrusive graves and other strong evidences of a later reoccupation, particularly on the west terrace of the main huaca, but there does not seem to have been a continuity of occupation straight through, and the architectural contributions of this reoccupation are minor and appear to have been merely in the nature of repairs in tapia to the adobe brick pyramids. With these exceptions, the ceremonial centers would seem to be structures of the Formative and Regional Florescent epochs. Even in the cases mentioned above, however, the Tiahuanacoid I influence appears to have been in the nature of a purely military or religious occupation of the principal

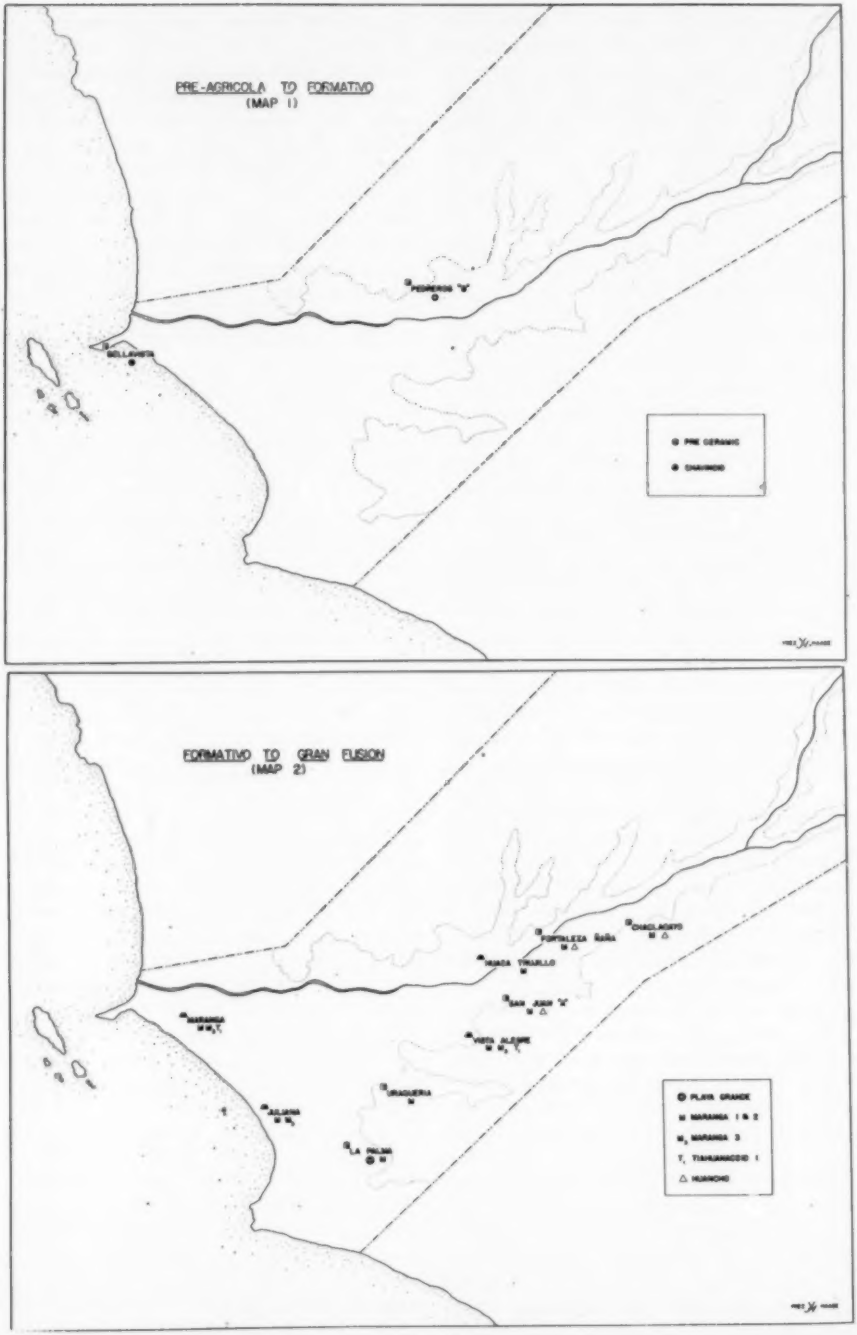
PRE-AGRICOLA TO FORMATIVO
(MAP 1)
PRE CERAMIC
CHAVINOID
FORMATIVO TO GRAN FUSION
(MAP 2)
PLAYA GRANDE
MARANGA 1 & 2
MARANGA 3
TEMBLADERIO 1
HUARICHO

FIG. 46.

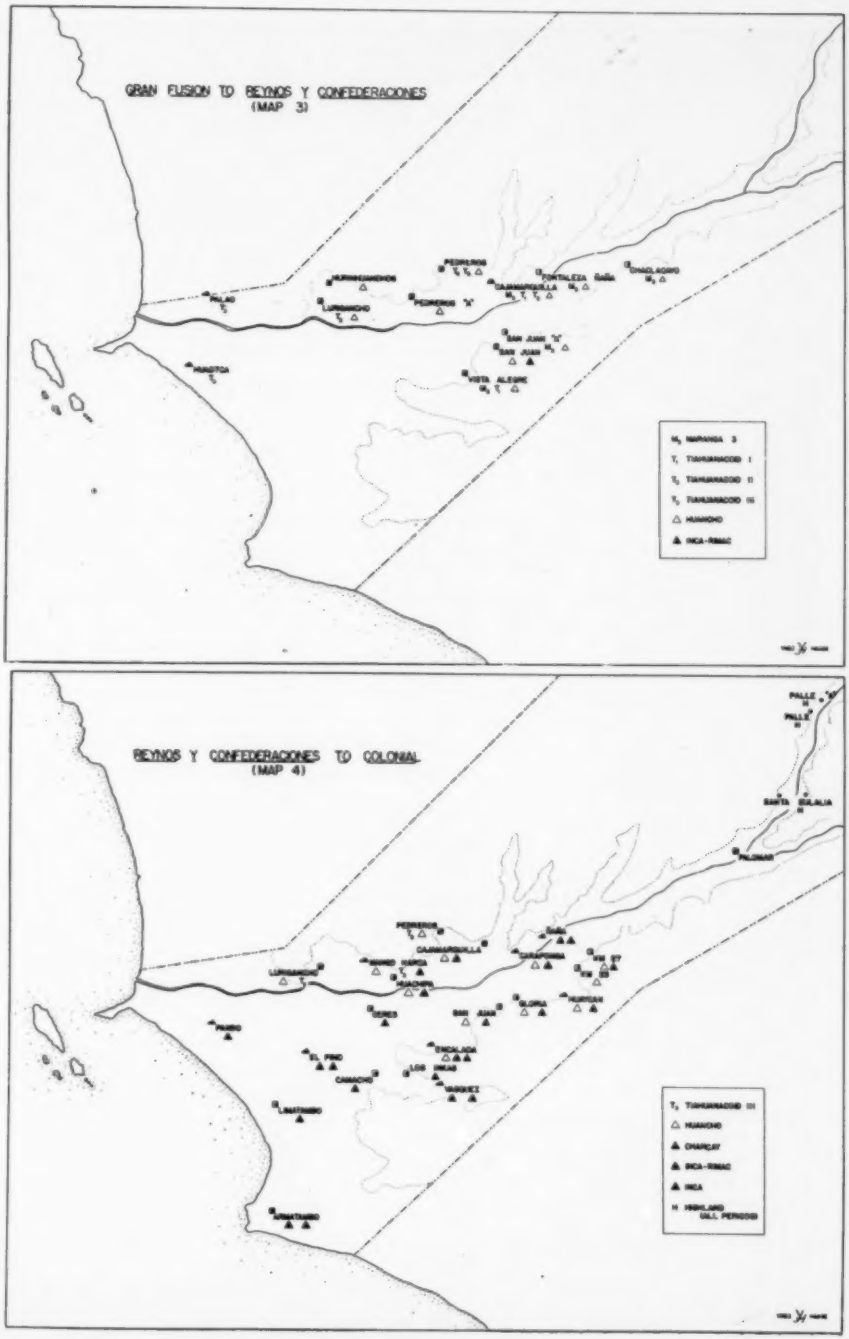
GRAN FUSION TO REYNOS Y CONFEDERACIONES
(MAP 3)
REYNOS Y CONFEDERACIONES TO COLONIAL
(MAP 4)

FIG. 47.

ceremonial sites, and to have contributed little or nothing to their development. Uhle (Kroeber 1925a: 207-8) mentions a similar aspect on the North Coast, and Schaedel (personal communications 1952-53) corroborates it in his findings.

In the category of *Urban Lay Centers* the most typical and important are Lurigancho, located on the north bank some 9 km. northeast of Lima; Pedreros, also on the north bank 16 km. east of Lima; and San Juan on the south bank 20 km. east of the capital. Others are Pedreros "A" and Hurinhuanchos, as well as Vista Alegre, which in its later occupation or reoccupation assumed this character.

The lay centers, with the exception of San Juan, which is rather compact, have that sprawling aspect so typical of this site category. There are no individual structures of outstanding importance or elegance; rather a great number of small structures or larger ones subdivided into small rooms or sections. The distances between groups of structures are nominal, and in many cases practically nonexistent. Pedreros is partially protected by an imposing, although plain, tapia wall; the others merely begin abruptly with the outer walls of the living quarters, and continue in a veritable maze of low walls and rooms. The lay aspect of Vista Alegre is almost impossible to distinguish at the site because of the encroachment of irrigation; however, it is still easily distinguishable on aerial photographs.

The architecture of the lay centers makes use mostly of tapia, although rough stone with a clay binder is often encountered in the smaller, more compact structures. Sometimes this type of stone construction will be found as foundations of tapia walls. It may be well to comment at this juncture on the comparative lack of clear-cut architectural diagnostic elements on the Central Coast after the beginnings of Tiahuanacoid influence. There seems to have been a general use of tapia in all epochs thereafter, with only minor differences in its employment. Purely Inca structures, such as Ñaña and Tamboinga (in the Chillón valley), have a tendency to use the tapia in massive blocks, giving one the feeling that the occupants were trying to duplicate in tapia their massive stone constructions of the Cuzco region, such as Sachsayhuaman and Quenco. Other than this stylistic manifestation, which is extremely hard to describe, there are only slight variations by epochs in the use of the ever-present tapia. Perhaps further observation or future study may bring out tell-tale elements which are at present obscure to the author.

The associated ceramics in the urban lay centers of the Rimac range from rather good Tiahuanacoid II at Pedreros (see Table 5), through the Rimac version of pressed ware at Lurigancho and Hurinhuanchos, to predominantly pure Huancho with some diagnostic Tiahuanacoid II and III ware at Vista Alegre and San Juan. The pressed ware of the Rimac can by no means be called the artistic apogee of this rather undistinguished ceramic style. The Huancho style, of which more later, is also no ceramist's or art connoisseur's dream, so that the pottery associated with the lay centers and the Fusional epoch in the Rimac valley provides little or no thrill in surface collection, and it is doubted that it will ever become the object of spirited bidding on the part of the world's museums. There is, however, from surface evidence, as well as test pits sunk at Pedreros, a considerable competence in textiles during this period. Such competence, while appearing never to have reached great artistic heights, does appear to have been general and not confined to the uppermost social strata.

In only one of the urban lay centers, namely Lurigancho, is there concrete evidence of occupation in the Imperial or Kingdoms and Confederations epochs, while only Vista Alegre exhibits signs of occupation in epochs previous to that of Fusional. Whether this would tend to indicate a large amount of building during the Tiahuanacoid period or a considerable time depth for the period is beyond the scope of the present article. However, the author favors the latter interpretation at this writing, both because of the amount of refuse deposits at the urban lay centers and the wide variance in ceramic styles between Tiahuanacoid I and III.

The *Provincial Elite Centers* show a much wider range of architectural styles than either of the categories so far considered. They also exhibit a greater variety in the actual planning and location of the sites themselves. In this aspect, they can be divided into two rough subdivisions: the first we might call hilltop and hillside sites, and the second, formal walled compounds. In the first subdivision are Palao, Huaycán, Ñaña, El Pino, Caraponga, Encalada, and Vasquez; while Mango Marca, Pando, and Huadtca fall into the second.

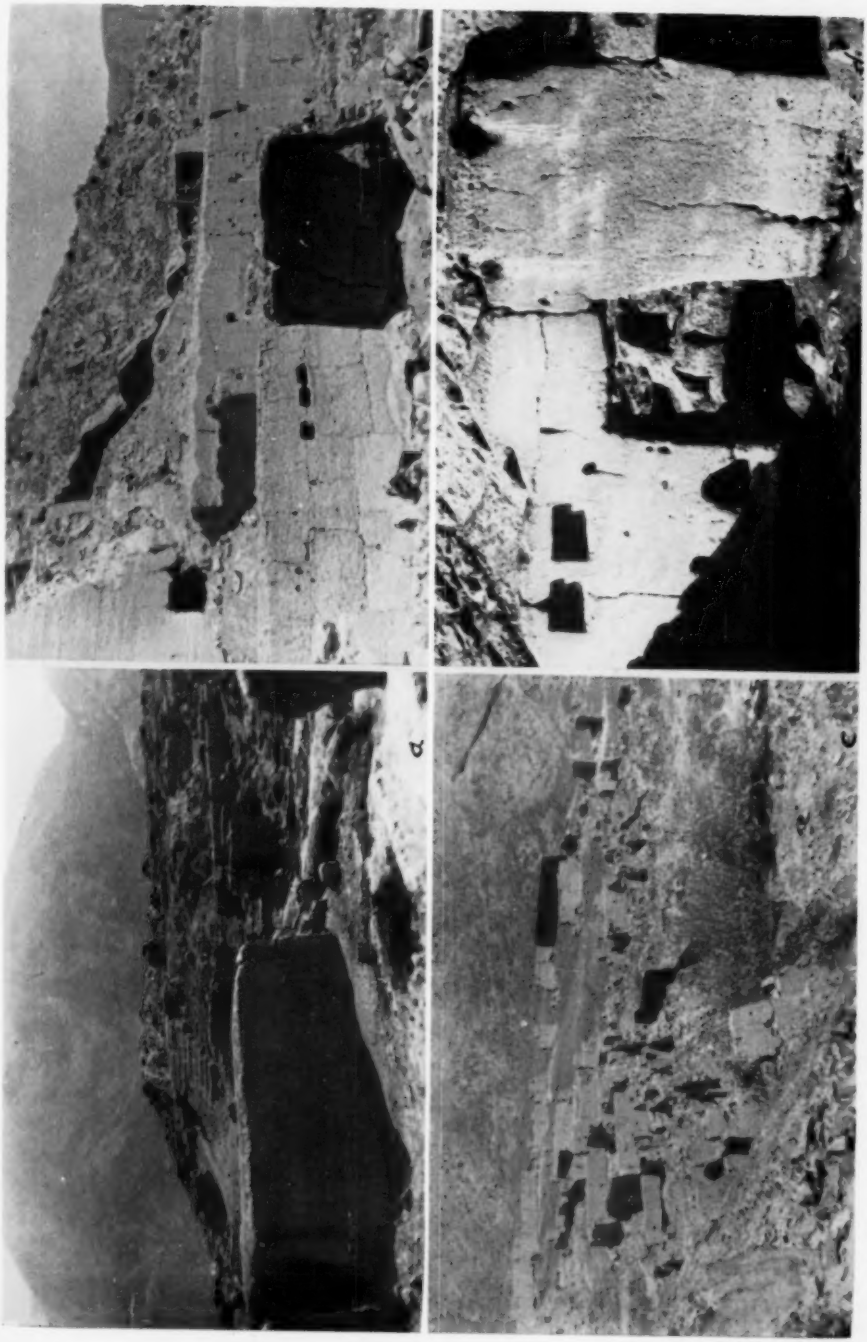

FIG. 48. Sites in the Rimac Valley, Peru. *a*. A temple complex at Cajamarquilla. *b*. The Citadel at Huaycán, looking West. *c*. Huaycán: a portion of the living area and outer wall, showing crenellations in background. *d*. Encalada: detail of tapia wall, doors and niches.

Palao, El Pino, Encalada, and Vasquez show a marked similarity in situation and feeling, although Palao pertains to the Fusional epoch, El Pino and Encalada to those of Kingdoms and Confederations and Imperial, and Vasquez appears to be straight Inca. They are all located on lowish rocky hills or spurs with the major constructions at the highest level and the minor constructions following the slopes downward toward level ground. The heights are fortified in all cases by high, massive walls. Those at Encalada are, by the way, the highest the author has seen on the Central Coast. In two cases, namely Vasquez and Encalada, the occupants have utilized the saddles between two high points as cemetery areas, while confining living, defensive, and formal structures to the slopes and heights. At El Pino even the cemetery is located on a steep slope. No extensive burial area is at present evident at Palao.

Caraponga, Ñaña, and Huaycán combine the planning features of the above-discussed four sites with rather extensive living areas on level ground. In fact, if the author had been able to isolate more than one occupation of Huaycán, it would have been listed as an urban lay center, evolving into a provincial elite, the living area on the flat is so great at this site (Fig. 48, *c*). This is not to say that this very thing might not have happened within the confines of one epoch; it is merely to say that no evidence of two distinct building periods was found, and, therefore, existing tangibles do not justify this otherwise logical assumption. The fortified areas at these three sites are mainly on the steep slopes above living quarters rather than crowning the heights; however, spurs on either side are walled and fortified.

Some noteworthy features of the hilltop and hillside sites are: the use of crenellated walls (Huaycán and Encalada); large, low-walled, trapezoidal, amphitheatrical enclosures (Caraponga and Encalada); and the circular tower at Ñaña. The "citadel" at Huaycán is remarkably imposing (Fig. 48, *b*), although devoid of elegance, and is in an excellent state of preservation.

Tapia is the prevalent constructional material, and the provincial elite centers show its use in the most massive form of all site categories in the Rimac. Ñaña uses more stone than the other sites, where stone is merely in evidence for wall foundations and occasional partition walls in the living areas. In all cases, the main outer fortification walls are tapia. Medium and large, square and rectangular, mold-made adobe bricks also appear at several of these sites. They are sometimes used in the weight-carrying walls of smaller structures, being placed on tapia foundations, and sometimes as partition walls; but their strangest use is at Encalada, as foundations for the main outer wall. This use is, however, in an isolated section of the site, which the author feels is later than the main part. Diagnostic sherds are not in evidence here, although utility ware sherds are very plentiful; however, doorways and niches are of the Incaic type (Fig. 48, *d*), and the general planning of this section of Encalada corresponds more closely to other sites of the Inca period on the Central Coast than it does to those of pre-Inca cultures.

The formal walled compounds, Huadtca, Pando, and Mango Marca, are possibly the most interesting sites, architecturally speaking, of all the 42 Rimac valley population centers considered. They are also the closest in appearance to the ceremonial centers of the pre-Tiahuanacoid era. Generally well preserved, although preparation of new cropland has obliterated some of Mango Marca's minor constructions in the past three years, they present both an archaeological challenge as well as a treat to the eye. They consist of one or more stepped pyramids, smaller than those of the ceremonial centers, and other major and minor constructions, the whole being surrounded by a formal, sometimes massive, wall. The pyramids, or huacas, are topped with a complex system of rooms and/or partitions, giving rise to speculation about the development of the "palace huaca" out of the "temple huaca." The planning of the pyramid-top area, plus the amount of living refuse encountered there, makes it apparent that these were not merely ceremonial structures. The appearance of these three sites is imposing, and what is more significant, of great elegance. Their importance during the later preconquest epochs must have been considerable, and they will merit a good deal of study in any anticipated work on that period in this region. Actually, were Mango Marca to have a greater extent and possess a larger living area of minor constructions, it would merit the classification of urban elite. It is, however, just this compact and highly self-

FIG. 49. Sites in the Rimac Valley, Peru. *a*. Storage pits at Cajamarquilla. *b*. Huancho culture grave at Pedreros. *c*. Preceramic grave at Pedreros "B." *d*. Tiahuanacoid III grave at Pedreros. The vessel at the head of the grave is covered with a gourd.

contained elegance which is one of the most interesting features of the formal walled compounds.

Mango Marca is located on the north bank of the river roughly 9 km. east of Lima. It is completely hidden from the view of the casual passer-by, and is approached by a short, but wretched, farm track. The main stepped pyramid rises abruptly from a cotton field, constituting a sight unrivaled in the Rimac for strangeness, except possibly by the Inca ruins of Los Inkas, which are situated in the middle of Peru's newest and most exclusive golf course! On the other side of the pyramid a great S-curved ramp leads down to the other structures of the site, which are located on an arid flat at the mouth of a medium-sized quebrada. The whole is surrounded by a tapia wall, in most part of impressive size.

Huadtca and Pando are about 1½ km. apart, between Lima and Callao, Pando being the closer to the capital. In fact, some of the newer residential developments of Lima abut on the site of Pando. There has been in the past a great deal of confusion among the sites of Maranga, Huadtca, and Pando, seemingly because of a combination of misinformation from the local farm laborers encountered in the vicinity and the fact that the Huadtca constructions adjoin those of Maranga at its southern edge, and are rather easily confused with Maranga on the aerial photographs. They are, however, three distinct sites, actually dating from three different epochs, each site possessing its own distinctive character. Huadtca, situated in a walled compound, is composed mainly of a great central huaca with a large, formal forecourt. The construction of the huaca can best be likened to a great flight of steps, as the east side rises in a series of three massive terraces, and the other three sides fall sheer. There are complicated subdivisions, corridors, and the like on each of the terraces, as well as atop the huaca itself. The walled forecourt, although now planted to cotton, must have been most impressive as it is on the grand scale and remarkably well designed to compliment the pyramid. The remainder of Huadtca is comprised of a number of small, rather badly preserved tapia structures near the periphery of the compound.

Pando is made up of five pyramidal structures, all roughly equal in size. They are arranged in a rectangle, one in each corner and one in the center, and are surrounded by a medium-sized wall, crenellated on two sides. Between the huacas, none of which are very extensive, are located various low structures, which could have been either living or storage space. It is difficult to determine which because of their bad condition. The huacas are connected by raised causeways. The whole is a remarkably neat and well planned layout, which shows considerable thought in its planning and appears to have been built as a unit, probably in a fairly short length of time.

The architecture of these three walled-compound provincial elite centers is almost completely tapia; stone and adobe bricks are present, but held to an absolute minimum. The cemetery at Mango Marca is large and obvious; at the other two sites only occasional looted graves are in evidence.

The ceramics at the provincial elite sites range from Tiahuanacoid II and III pressed ware to purest coastal Inca. Palao and Huadtca have produced no diagnostic sherds other than those of the pressed ware; Ñaña and Vasquez show up as purely Inca sites. In between, Mango Marca's surface pottery is almost completely Huancho with a few Chancay or Chancay-influenced pieces; Huaycán and Caraponga have a mixture of Huancho and Inca-influences Huancho; Encalada and El Pino have mostly Chancay and Inca-Chancay; and Pando has shown nothing but Inca-influenced Huancho sherds. Incidentally, at El Pino, located on a main concrete highway only six or seven minutes from the heart of Lima, is one of the most extensive and deep *basurales* (refuse deposits) of Inca-Chancay sherds the author has encountered. Almost every technique of this most varied style is represented in quantity, and the quality is uniformly good; in many cases excellent. This is the style that Strong (Strong, Willey and Corbett 1943, Figs. 10, 13, 19) called Inca-Associated when he encountered it during his excavations at Pachacamac. Work at El Pino would well repay anyone desirous of further studying the late period ceramics of the Central Coast.

The Rimac valley possesses 2 examples of the Urban Elite Center. These are Cajamarquilla and Armatambo. The former is the best known of the 2 and is located on the north bank 18 km. east of Lima in a large quebrada, the mouth of which is wholly filled by this tremendous site. In fact, the ruins spread over

the rocky spurs on either side. The ruins are too well known to call for a great deal of further description here. Villar Córdova (1935: 183-4), gives a fine account of the site with its vast living area, great number of major constructions and many cylindrical storage pits or "granaries" (Fig. 49, *a*). The architecture is mainly tapia and the ceramics on the surface in the living area range from fragments of cumbrous bowls of the Tiahuanacoid II period (Kelly 1930, Fig. 62) to Inca-influenced ware. Cajamarquilla appears to have had a longer continuous occupation than any other site in the valley. Regrettably, its famous cemetery is now almost entirely given over to irrigated agricultural land, and the small section remaining is so thoroughly looted as to be practically useless for any further archaeological work. However, there are undoubtedly many groups of graves scattered among the living compounds, but the complexity of the site and its great extent would seem to make the excavation of these graves rather impractical and costly as a guide to the history of Cajamarquilla as a whole.

Armatambo is south of Lima on the outskirts of Chorrillos, a seaside suburb of the city. It nestles against the landward base of the Morro del Solar, a large lofty eminence which forms the southern boundary of the bay on which are located many of Lima's residential suburbs, such as Magdalena del Mar, Miraflores, and Barranco. The ruins, unfortunately and aromatically, begin on the north at Chorrillos' municipal dump, which is steadily encroaching on the northernmost compound, and extend some 3 km. to the south, giving way to nearly 2 km. more of cemetery. The whole is in rather bad condition, but the planned elegance of the many large, walled compounds can still be discerned. There are vestiges of reliefs still to be seen on the thick tapia outer walls of some, crenellations on others, and the complex internal subdivisions of most can still be traced. The architecture is almost completely tapia, with a minor use of large mold-made adobes.

Surface sherds are abundant, and are mainly a mixture of rather bad Chancay ware and Inca-Chancay. The author has found no sherds of any epoch earlier than that of Kingdoms and Confederations. There is a great profusion of modeled adornos and mold-made figurine fragments. There is also an appreciable quantity of pure coastal Inca sherds. One gets the impression of a close connection between Armatambo and the later days of Pachacamac, which is located not far to the southward.

The *Unit Sites* are, not surprisingly, the most numerous of any category. They cover all epochs from the Preceramic (Fig. 49, *c*) to the Imperial and are impossible to subdivide effectively, ranging as they do from the crude compound at Pedreros "B" to the compact little Inca huacas of Limatambo and Ceres. There are hilltop and hillside outposts, such as Chaclacayo, Fortaleza Ñaña, and La Palma; town or village units such as Gloria, Huachipa, and San Juan "A"; groups of huacas and walls as at Camacho and Los Inkas; and large corrals with small groups of house structures, as typified by Km. 25 and Km. 27. In short, the unit sites represent almost every type of functional requirement of small population groups through the epochs, and appear to have been built in every period to satisfy these changing requirements. Suffice it to say, in the analysis of this type of site, that there is no evidence in the earlier periods of anything larger being built, but by the same token, there seems to have been no cessation of this type of site construction in the later periods, in spite of the establishment of much larger population centers. There is no reason why this should not be so, following as it does the pattern of the growths of urban civilizations elsewhere; it would rather be strange were it not the case.

Architecturally speaking, the unit sites are equally variegated. All of the many building techniques of the central coast are represented. Hand- and mold-made adobes, stone, tapia, and various combinations are present. Practically all the ceramic styles of the valley are encountered as well; the only two the author has not seen at the unit sites are pure Chancay and Tiahuanacoid I. Chavinoid/Ancón has not been personally encountered, as the Bellavista site is now completely built over, but it has been documented there by the late Max Uhle (1913). No other Chavinoid sites in the valley have been located up to the present writing.

The absence of the Chancay and Tiahuanacoid I styles at the unit sites does not seem too difficult to explain. The former does not appear to have been the general late-period style of the valley as it is of the valleys to the north; while the latter tends only to show up at sites of great importance, which these obviously are

not. They are purely local sites, with the exception of the Inca way-stations, and therefore only the local styles are in evidence, with utility ware predominating.

Before proceeding to correlate the foregoing descriptive material with Schaedel's North Coast findings, it would seem opportune at this time to try to shed some light on the "Huancho" style and culture which have been mentioned above a number of times. In the reconnaissance of the Rimac which led to the present work, the author was struck by a number of significant points. Among these were the almost complete absence of Chancay and Tiahuanacoid ceramics and the abundance of a ware which did not fit into any published classification of Central Coast pottery. True, there were a number of resemblances to the Inca-Chancay (Inca-Associated) style at Pachacamac and to some of the cruder Tiahuanacoid vessels from Ancón, but in the main, this middle period ceramic of the Rimac stood on its own ungainly and unlovely feet, stylistically speaking.

There was also the fact that, although most of the large, walled tapia structures of the valley were called "Inca" by Peruvians, there was, in most cases, not one Inca sherd in evidence; merely an overpowering accumulation of the pottery mentioned above. It then became apparent that the architecture of the sites with Inca sherds and those few with Tiahuanacoid sherds differed from the architecture of these other ruins. Also, at these sites, where huaqueros had been active, the ground was littered with textiles of a different type from those associated with either the Tiahuanacoid or Chancay cultures, as well as different grave contents, artifacts, etc.

In the face of this accumulation of evidence, the author did not feel too much trepidation in deducing that perhaps the culture sequence for the Rimac did not follow that of its northern neighbors, the Chillón, and Chancay, and that there was a hitherto unknown factor here, which by its very ubiquitousness at least, had to be reckoned with. A check of available reference material disclosed pertinent bits in Villar Córdova (1935: 175) and in Martin Pastor (1942: 390 and following). These contained references to a pre-Inca tribe known as Huanchos who settled in the Rimac valley. It was decided, therefore, that Huancho would be a fitting preliminary name for these cultural manifestations, at least until such time as the culture could be thoroughly isolated and the validity of connecting the name with these references could either be verified or disproved. Means (1931: 192, 193) also speaks of groups from the *ceja de la costa* (also referred to as the *ceja de la sierra* and used locally for the western slopes of the Maritime Cordillera) which were rather backward, but well versed in agricultural terracing and irrigation, used a type of masonry involving uncut stone; and had crude pottery. All these characteristics are present in a greater or lesser degree at sites where the Huancho style of pottery is present.

Then, in September of 1952, the author and Schaedel proceeded to sink a number of test pits in the cemetery area of the Pedreros site, where surface collections disclosed a mixture of Huancho and some of the best Tiahuanacoid II ware that had so far been encountered during the Rimac survey. The basic idea underlying the excavation was not to isolate a culture, but to try to explain, at least in part, the dearth of Tiahuanacoid architecture and sherds in the valley. Some twelve graves were excavated, which disclosed non-Tiahuanacoid, non-Chancay graves (Fig. 49, *b*), with two graves of the Tiahuanacoid III (Fig. 49, *d*) period amongst them at the same level in the same stratum. Here, then, was a clear differentiation between the two cultures, and at least a partial dating for the Huancho style.

It is not the purpose of this article to define the culture and its attendant ceramics, textiles, and architecture thoroughly and completely. Such definition must await further excavation before sufficient data are available. At that time the author expects to prepare a full report. However, from surface reconnaissance and the test excavations mentioned above, certain diagnostic elements have been noted to be present in the Huancho culture. These are: 1) massive tapia architecture with no planned breaks or use of blocks, and the use of crude, uncut stone construction for subsidiary structures; 2) circular tombs, generally unlined, and the use of individual circular chambers in the case of multiple burials; 3) decorated textiles in the form of heavy wool belts of excellent quality and workmanship with rather sophisticated and well executed simple designs; mantles and shirts crudely woven of heavy cotton cloth; 4) bodies of adults with hands wrapped in

various colored wool yarn, rather than textile wrapped as at Ancón Necropolis (Reiss and Stübel 1887); 5) finger, rather than hand and arm, tattooing; 6) short, well-made, well-polished llama or deer bone weaving swords generally present in quantity in the mummy bundles, and made more conspicuous by the complete absence of the usual wooden weaving swords; 7) tremendously long and heavy copper or wooden (!) shawl pins; 8) ceramics of the heavy, hard, brownish-red paste associated with the Rimac valley highland sites. These ceramics seldom exhibit any painted decoration; variety is achieved by experimentation with forms, mostly with the neck and collar shapes. When painted decoration appears, it is extremely crude, consisting of simple streaks of white, usually sloppily applied. Grave offerings of ceramics are generally of well-used, badly fire-blackened utility ware with a wide-mouthed olla shape predominating.

The impression is gained that the huancho culture reached the coastal region of the valley practically simultaneously with the Tiahuanacoid II culture and replaced it, at least above the 12 kilometer line; also, that it possessed a considerable time depth. The origins seem to be in the *ceja de la sierra*, an impression which is borne out by ceramic associations (see Maps 2, 3, and 4). The culture does not appear in valleys to the north of the Rimac; whether it is a one-valley manifestation or not must await future reconnaissance of the Lurín, Chilca, and Mala valleys to the south.

In summation, the development of the Rimac follows the pattern of development of other coastal valleys of its size and importance, with the exception of the fact that the Huancho occupation seems to have inhibited the normal spread of the Tiahuanacoid cultures. This appears also to have had a definite effect in the epoch of Kingdoms and Confederations as well, as during this epoch there is very little evidence of the valley, as a whole, being a part of the Chancay "confederation," and no evidence has come to light of its having any connection with the Cañete (Huarco) "confederation" to the south (Kroeber 1937, Pls. 82-87). It does not seem logical to attribute this to a lack of importance of the valley itself, as it has been noted above that the Rimac is one of the Central Coast's more important valleys. From the highly fortified nature and number of the Huancho sites, it is more tenable to surmise that the atmosphere of the valley was anything but welcoming to penetrations from other regions, at least until the clearer heads, greater organization, and stronger legions of the Incas prevailed. The coastal plain of the Rimac does, however, show some of the normal Tiahuanacoid and Chancay influences, but from the point where the valley begins to narrow and becomes rather easily defensible, this is not the case.

From the sites examined, the evidence points to the occupation of the valley beginning with small, widely scattered settlements in the Preceramic and early Formative epochs, followed by valley integration and further small settlement building in the later stages of the Formative epoch. This stage also saw the beginning of ceremonial structures. During the Regional Florescent epoch, the building of ceremonial centers became general, and the culture of the Rimac spread to the adjoining Chillón and Lurín valleys. Strong (1943, Figs. 13-17; Pl. 4) illustrates ceramics of the Maranga style from Pachacamac at the mouth of the Lurín, and Schaedel has encountered graves of this culture further up valley on reconnaissance; while the author has found numerous sherds of this style on the surface at Cerro Culebra, at the mouth of the Chillón, as well as at Huacóy in the same valley. Further evidence of the spread of the Maranga style was found at Ancón Necropolis in 1952 by Srs. José Respaldiza and Marino González of the Peruvian Ministry of Public Education. Respaldiza and Gonzalez excavated a considerable number of Maranga 3 graves at the lowest level of the Necropolis very near Uhle's Site "P" (Strong 1925, Pl. 41). These grave excavations were observed by the author.

The Rimac, then seems to have suffered the same Tiahuanacoid I influences as other valleys of equal importance on the coast, with these appearances occurring only at the most important sites of the Regional Florescent epoch. Subsequently, the above described split in the "personality" of the valley occurred, with integration taking place only when the Inca occupation was an accomplished fact.

In the main, Schaedel's findings are conclusively borne out by this survey. He states that major sites on the North Coast pertain to the portion of Peruvian prehistory beginning with the Regional Florescent epoch and ending with the Imperial. No evidence has been

found of any earlier building of major sites in the Rimac. He then states that the ceremonial center antedates in all cases the urban elite center, and generally the urban lay center. This is very definitely the case in this valley. The urban elite aspect of Cajamarquilla and the building of Armatambo may possibly have their beginnings in the epoch of Kingdoms and Confederations, but there is no evidence to suggest any earlier inception; while only at Vista Alegre of the urban lay centers can be found any traces of occupation in the Regional Florescent epoch. The others all date from the Fusional. To carry Schaedel's conclusion one step farther, the Rimac pattern tends to demonstrate that the ceremonial centers are a product of what is commonly referred to as the Early period; the urban lay centers of the Middle; and the urban elite centers of the Late. The provincial elite centers are all post-Tiahuanacoid in origin, and, combined with the evidence above, lead one to the conclusion that no planned urbanization was attempted until after the "secularization" of the valley was well under way.

Whether this "secularization" was a result of Tiahuanacoid penetration and the subsequent breakdown of the old, seemingly priest-dominated order, or whether it would have occurred without outside influences is obviously impossible to state from the archaeological evidence. It is possible to say, however, that the lay dwellings of the pre-Tiahuanacoid epochs, or rather those unconnected with any huaca complex, are in the main scattered and show no signs of urban planning. In cases where any considerable grouping is found, the arrangement is still individualistic and haphazard. On the other hand, practically all popuation centers of the post-Tiahuanacoid epochs show a greater or lesser degree of such planning. Perhaps Schaedel's present studies of the Tiahuanacoid horizon on the coast and its significance may shed further light on the reasons for this manifestation.

Certain of Schaedel's conclusions, such as those relating to architectural differences between valleys and the effect of the development and expansion of the Chimu state, are obviously not within the scope of this survey. However, his observation on the tendency in

TABLE 4. CULTURE SEQUENCE IN THE RIMAC VALLEY, with terminology for the Peruvian Culture Epochs as adopted at the Lima Conference, January 8-9, 1953.

PERUVIAN CULTURE EPOCHS	CULTURES IN RIMAC VALLEY		TYPICAL SITES IN RIMAC VALLEY		FORMERLY USED EQUIVALENT TERMS
	Below Km. 12	Above Km. 12	Below Km. 12	Above Km. 12	
IMPERIAL (Imperial)	Inca/Chancay	Inca/Rimac	El Pino, Armatambo Vasquez	Maña, Huaycán	Inca Inca-Associated Inca-Associated, Sub-Chancay
REINOS Y CONFEDERACIONES (Kingdoms and Confederations)	Huaura	Huancho	Armatambo El Pino	Gloria Careponga Huaycan	Chancay
	Tiahuanacoid 3	Huancho	Lurigancho Mango Marca	Pedreros Cajamarquilla	Late Ancón I, Black-White-Red Geometric, Epigonal
GRAN FUSIÓN (Fusional)	Tiahuanacoid 2	Huancho & Tiahuanacoid 2	Palao Huaca Huantes Huruhuanchos	Pedreros	Middle Ancón 2, Epigonal, Huaura
	Tiahuanacoid 1	Tiahuanacoid 1	Vista Alegre Maranga	Cajamarquilla	Middle Ancón I, Coast Tiahuanaco, Pachacamac
REGIONAL FLORESCIENTE (Regional Florescent)	Maranga 3	Maranga 3	Maranga Juliana	Vista Alegre	Proto-Lima, Nievería, Cajamarquilla, Early Lima, Pachacamac Interlocking
	Maranga 2	Maranga 2	Maranga Juliana	Vista Alegre Fortaleza Maña San Juan "A"	Pachacamac Interlocking, Interlocking, Proto-Lima
FORMATIVO (Formative)	Maranga 1	Maranga 1	Maranga Juliana	Huaca Trujillo	Interlocking, Proto-Lima
	Playa Grande 2		La Palma		
	?	?			
	Chavinoid/Ancón	?	Bellavista		Early Ancón-Supe
AGRICULTURA INCIPIENTE (Incipient Agriculture)	?	Agriculture Incipiente	Pedreros "B"		Pre-Ceramic
PRE-AGRICOLA (Pre-Agricultural)					(Early Hunters)

CORRECTION: Pedreros "B" should be in the column headed "above Km. 12."

the Late periods to concentrate masses of the population into either large urban centers and/or strategically important military or agricultural settlements is amply borne out by the urban lay, urban elite, and provincial elite centers of the Rimac (Table 4, and maps). His statement that large urban developments are usually related to, or dependent upon, intervalley irrigation systems is, however, impossible either to uphold or dispute in the present work. As stated at the beginning of this article, there are signs that the Rimac and the Lurín were connected in preconquest times by an intervalley irrigation system, but whether Armatambo was related to or dependent upon it cannot be determined with any degree of assurance. On the other hand, there is no intervalley irrigation system in the vicinity of Cajamarquilla. Therefore, the application of this North Coast observation to the Central Coast will have to await other valley surveys in the region.

Certain tentative conclusions can be drawn from changing architectural styles.

1) The sites that are predominantly of stone construction are: Pedreros "B" (Preceramic), Pedreros "A" (Fusional), Km. 27 (Imperial), and Palomar, Palle "A" and "B," and Santa Eulalia "A" and "B" (all Highland).

2) The sites that make use of mostly handmade adobes in their construction are Juliana, Maranga, and the Huaca Trujillo. Of these, the Huaca Trujillo pertains to the Formative epoch only, while the other two pertain to that epoch and to the Regional Florescent as well. The combination of handmade adobes and tapia is found at Vista Alegre, and at Cajamarquilla in its older section which dates from the early Fusional epoch. Vista Alegre, as stated earlier, appears to be initial Regional Florescent and terminal Fusional.

3) The tapia and stone combination is encountered at the Regional Florescent and Fusional sites of Chaclacayo and Fortaleza Ñaña; the Fusional site of Palao; the Fusional and Kingdoms and Confederations site of Pedreros, and the Imperial sites of Ñaña, Gloria, Huaycán, and El Pino.

4) Pure tapia occurs in the Formative and Regional Florescent epochs at La Palma and San Juan "A"; in the Fusional at Hurinhuanchos and Huadtca; in the Fusional and Kingdoms and Confederations at Luringanchos, and in the Imperial at Vasquez, Pando, Limatambo, Los Inkas, Ceres, and Mango Marca.

5) The combination of tapia and mold-made adobe bricks is encountered predominantly only at the Imperial sites of Cajamarquilla, Armatambo, and Encalada.

The first conclusion to be drawn from the above is that stone, after the Preceramic epoch, was abandoned as a major building material for some time. It then appears in that capacity at only one living site in the lower valley. (The other listed site, Km. 27, is mostly large corrals.) On the other hand, it is the basis of *ceja de la sierra* construction, and is so used at all highland sites visited in the Rimac and neighboring valleys. The second conclusion is that the use of handmade adobe bricks is diagnostic of the pre-Tiahuanacoid epochs. These adobes do not have to be present in all structures of those epochs; on the other hand they do not appear in later structures. The third conclusion is that the use of mold-made adobes is characteristic of the Imperial epoch. They do appear before, but minimally; when they are used to any considerable degree, it is only in constructions of this epoch.

It is hoped that this article will serve both as some slight aid to those interested in the archaeology of the Central Coast of Peru and as a guidepost to the many problems there still remaining unsolved. The importance of the Rimac, its many sites still uninvestigated, and its geographical accessibility make it particularly attractive for further work toward this end.

TABLE 5. POPULATION CENTERS OF THE RIMAC VALLEY

Classification by Pottery Styles

SITE	POTTERY STYLES *	REFERENCE
La Palma	Playa Grande 2	*Kroeber, 1926.* Figs. 11, 15, 18; Plate 88, d. *Strong, Willey, and Corbett, 1943.* Pachacamac, Fig. 15, a-c; Cerro de la Trinidad, Plates 6, h; 7, d-h, j, m. *Jijón, 1949.* Plates XV, 2; XXI, 5; XXIX; XXXII, 1; XXXIII, 1, 4.
Uraquería	Maranga	*S.W. & C.* Pachacamac, Figs. 13, i; 14, c, g; 15, a. *Jijón.* Plate X, 1, 4.
Huaca Trujillo	Maranga	*S.W. & C.* Pachacamac, Figs. 13, e; 14, b, g; 15, a, m. *Jijón.* Plates IX, 1-3; X, 1, 3, 4; XI, 5; XII, 2, 3; XLVI, 2, 3.
Juliana	Maranga	*S.W. & C.* Pachacamac, Figs. 13, c, f, g, j, k; 14, b, d, g, h-k; 15, a, c, d, f-l; 16, a, d, k, l-n; 17, a, f, j-l. *Jijón.* Plates IX, 1-3; X, 1-5; XII, 2-4, 8; XIII, 2-4; XIV, 4; XV, 2, 3, 6; XVI, 2-4; XVIII, 1; XIX, 1; XXIII, 2, 6, 8; XXV, 2, 3; XXXV 3; XXXVIII, 2, 4; XL, 2; XLI, 3; XLVI, 1-3; L, 2, 3.
Maranga	Maranga Tiahuanacoid I	*S.W. & C.* Pachacamac, Figs. 13, a-c, e-h, j-k; 14, d-k; 15, c-d, f-l; 16, a, d, l-n; 17, a, f, j-l. *Jijón.* Plates IX, 1-3; XII, 1-4, 8; XV, 5, 6; XVI, 2; XVIII, 1; XIX, 1; XXIII, 2, 5, 8; XXV, all; XXVI, 5; XXXVII, 3-4; XXXVIII, 4-6; XXXIX, 5-6; XL, 2-4; XLI, 3; XLII, 1, 2; XLVI, 1-3; LI, 1, 2, 4; L, 1, 2. *Gayton, 1927.* Plates 91, b; 92, f; 93, d-f; 94, c, f, 1; 95, a, c, f; 97, f. *Strong, 1925.* Plate 46, c, f, g, n, o. *Bennett & Bird, 1949.* Plate 40. *Doering, 1952.* Plate 94.
Chaclacayo	Maranga, Huancho	*S.W. & C.* Pachacamac, Figs. 13, h, j; 14, all; 15, c, f, k. *Jijón.* Plates X, 3, 4; XI, 5; XIV, 4; XLVI, 3.
Fortaleza Ñaña	Maranga, Huancho	*S.W. & C.* Pachacamac, Figs. 13, c, h, j, k; 14, a, c, g, k; 15, c, d, f, k; 16, a, d; 17, a, c, f. *Jijón.* Plates X, 4; XI, 5; XII, 3; XIV, 4.
San Juan "A"	Maranga, Huancho	*S.W. & C.* Pachacamac. Figs. 13, f, j; 14, c, e, g, h; 15, c, k. *Jijón.* Plates XIV, 4; XV, 3; XVI, 4.
Vista Alegre	Maranga, Huancho Tiahuanacoid I	*S.W. & C.* Pachacamac. Figs. 13, a-c, e-h, j, k; 14, all; 15, all; 16, a, d, l-n; 17, a-f, j-l. *Jijón.* Plates IX, 1-3; XII, 2-4, 8; XIV, 4; XVIII, 1; XXIII, 2, 7; XXXIII, 2; XXXVIII, 5-6; XXXIX, 5-7; XL, 2, 4; XLI, 3; XLII, 2; XLVI, 1-3; LI, 4. *Gayton.* Plates 91, b; 92, c, f; 94, c. *Strong, 1925.* Plate 46, g. *Kroeber, 1925a.* Plates 63, d; 73, d; 74, j, i; 77, m.
Pedretos "A"	Huancho	
Palao	Tiahuanacoid II	*Jijón.* Plates LI, 4-6; LII, 1-4. *Strong, 1925.* Plates 44, g, i; 45, b, i. *Kroeber, 1925b.* Plate 75, h-j.
Huadica	Tiahuanacoid II	*Jijón.* Plates LI, 4-6; LII, 1-4. *Strong, 1925.* Plates 44, g, i; 45, b, i. *Kroeber, 1925b.* Plate 75, h-j.
Hurinhuanachos	Huancho	
Cajamarquilla	Maranga 3 Tiahuanacoid I Tiahuanacoid II Huancho Inca-Rimac	*Gayton.* Plates, 91, b, d, e; 92, c, d, f; 93, a-f, i-l; c, j, l; 96, a; 97, c, e, f. *Strong, 1925.* Plates 44, f; 46, d, g, k. *Jijón.* Plate LI, 4. *S.W. & C.* Figs. 8, e; 10, c; 11, a; 12, a, b, f. *Kelly, 1930.* Fig. 62. *Kroeber, 1925b.* Plate 73, d.
Pedretos	Tiahuanacoid II Tiahuanacoid III Huancho	*Means, 1931.* Fig. 122, B.C. *Strong, 1925.* Plates 44, g, i; 45, b. *Jijón.* Plate LII, 3. *Kroeber, 1925b.* Plates, 71, g; 72, h; 73, j.
San Juan	Huancho Inca-Rimac	*S.W. & C.* Figs. 8, e; 9, f, g; 10, c, d; 11, g; 12, b; 19, a, d, g.
Lurigancho	Tiahuanacoid III Huancho	*Strong, 1925.* Plate 44, g. *Jijón.* Plate LII, 3. *Means, 1931.* Fig. 122, B.
Armatambo	Chancay, Inca- Chancay, Inca	*Kroeber, 1926.* Plate 80, A; 81, E; 82, D. *Strong, 1925.* Plates 42, a, c, h, k, m; 43, c-g. *S.W. & C.* Figs. 7, b-d; 8, e, g; 9, a, g; 10, b-d; 11, g; 12, b-d; 19, a, b, d, e, g.
Carapongo	Huancho Inca-Rimac	*S.W. & C.* Plates 10, c; 11, g; 19, a, g.
Ñaña	Inca-Rimac Inca	*S.W. & C.* Figs. 7, c, d; 8, e-g; 9, a, e-g; 10, c, d; 11, a, g, h; 12, a-c, f; 19, a-c, g, l.

* The isolation and typing of the Huancho ceramics have not yet, unfortunately, reached a sufficiently completed state for the author to be able here to refer to published references.

SITE	POTTERY STYLES *	REFERENCE
Encalada	Huancho, Chancay Inca-Chancay	*Strong, 1925.* Plates 42, c, m; 43, c. *S.W. & C.* Figs. 12, a, b, f; 11, g.
Vasquez	Inca-Chancay Inca	*S.W. & C.* Figs. 7, a-d; 8, e; 9, a, g, f; 10, b-d; 11, a, g; 12, a-f.
El Pino	Chancay Inca-Chancay	*Strong, 1925.* Plates 42, a, c, h, i, m; 43, c, d. *S.W. & C.* Figs. 10, e, f; 11, a, d, e, g, h; 12, a, b.
Pando	Inca-Rimac	*S.W. & C.* Fig. 11, a, b.
Limatambo	Inca-Rimac	*S.W. & C.* Figs. 10, c; 11, a, g.
Km. 27	Inca-Rimac	**
Km. 25	Inca-Rimac	**
Gloria	Huancho Inca-Rimac	*S.W. & C.* Figs. 10, f; 12, a, f.
Los Inkas	Inca-Rimac	*S.W. & C.* Figs. 7, c, e; 9, d-g.
Camacho	Inca-Rimac	*S.W. & C.* Figs. 7,c, e; 9, d-g.
Huachipa	Huancho Inca-Rimac	*S.W. & C.* Figs. 10, c; 12, c, e.
Ceres	Inca-Rimac	**
Mango Marca	Huancho Tiahuanacoid III Inca-Chancay	*Strong, 1925.* Plate 44, g. *Jijón.* Plate LII, 3. *Means.* Fig. 122, B. *S.W. & C.* Figs. 10, f; 12, a-e; 19, a, b, d, g.
Huaycán	Huancho Inca-Rimac Inca	*S.W. & C.* Figs. 7, c-e; 8, e; 9, a, e-g; 10, b-d, f; 11, a, b, g; 12, all; 19, a, b, d, e, g, l.

* The isolation and typing of the Huancho ceramics have not yet, unfortunately, reached a sufficiently completed state for the author to be able here to refer to published references.

** The author has not been able to find published illustrations of the late period utility ware which is the only pottery found at this site. It is, however, consistently found in association with the Inca-Rimac (S.W. & C. Inca-Associated) style, and therefore has been classified as a part of that style. An effort has also been made here to differentiate between the three stylistic manifestations of the Imperial epoch which are encountered in the Rimac. These are pure Coastal Inca, Inca-Chancay, and Inca-Rimac. The author has used the term "Inca-Rimac" to refer to that Inca-associated or influenced pottery possessing little or no Chancay elements of form, design, or paste, and the term "Inca-Chancay" for the ware showing a definite relationship to the Chancay style (S.W. & C. 1943: 90). There are, however, a few points of similarity of design between the two; hence the coincidence in this table of certain identical references.

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COLUMBIA UNIVERSITY
New York
January, 1954

DRINKING TUBES ON ARCHAEOLOGICAL VESSELS FROM WESTERN SOUTH AMERICA

STIG RYDÉN

IN 1952 I had the opportunity of investigating about 70 slab cists in the province of Muñecas, Bolivia.* Among the vessels found in the graves there were a few goblets provided with a tubular protuberance on one side. As my collections and personal outfit are still detained by the Bolivian authorities, the appearance of these vessels is illustrated here only by a drawing of a vessel taken over by the Museo Nacional "Tihuanacu," La Paz (Fig. 50). A similar but undecorated vessel from the same region, Tacacacoma, is published by Schmidt (1929: 256, and Fig. 2). On the latter vessel the tubular protuberance is joined to the body of the goblet by two bars. Other minor variations in vessels of this type appear in the shape of the goblets and in the shape and placing of the tubular protuberance. Sometimes, for instance, the tube is longer than on the vessels depicted here and very often a raised human face is found on the outer side opposite the tube. Some vessels of the latter shape in the Museo Nacional "Tihuanacu," La Paz, which are from the same region investigated by me, are published by Ruben (1953, Figs. 39, 41). It must be pointed out that Ruben's illustrations 40 and 41 probably are transposed. Thus the vessels in Figure 41 are erroneously stated to be from Carangas instead of from Larecaja. The raised human face as well as the painted decoration on the vessels treated here prove their affinities to the Decadent Tiahuanaco goblets which are found in the focal area of the Tiahuanaco culture south of Lake Titicaca.

The tubular protuberance may very well be considered a spout, especially as examples of other supposedly spouted vessels are found in the focal area of the Tiahuanaco culture. Ruben calls the protuberance a "Henkel," an ear. When studying the Muñecas vessels in the Museo Nacional "Tihuanacu" and my own finds before they were packed, I was convinced, however, that the protuberance must be a drinking tube and not a spout. The tube, at least on some vessels, is shaped and placed in such a manner that the contents of the goblet will overflow the rim *before* coming out through the supposed spout if the goblet is more than about half full. This indicates that the tubular protuberance must be a drinking tube and not a spout. In the following, the term "drinking tube" is used only to identify outlets to which this remark can be applied. There may well be, and are, ambiguous cases in which the outlet could theoretically serve either as a drinking tube or as a spout. In these cases the terms "tubular protuberance" or "spout" are adopted. The intention of the spout is to facilitate the distribution of the contents of the vessel into special drinking vessels. It is in this case interesting to note, however, that tubular outlets are met with on vessels which, as is evident from their shape and size, are drinking vessels or libation vessels, but not on jars whose shape and size suggest pouring or storage functions. This fact may argue in favor of the determination "drinking tube" in ambiguous cases.

In a study of the drinking tube and tobacco pipe in North America, Birket-Smith (1929: 38) has pointed out the almost complete and surprising lack of drinking tubes in South America. Apart from the *bombilla*, the tube (probably of Spanish introduction) used when drinking maté, we find the drinking tube in use only among the Yaghan Indians of Tierra del Fuego. Thus Birket-Smith considers the drinking tube one of the many cultural elements common in North America but in South America occurring only in the southernmost part of the continent. It must be mentioned, as was also pointed out by Birket-Smith, that the medicine men of the Chocó Indians of Panama and Colombia make use of a tube in curing a sick person; this is probably a secondary use of the drinking tube, just as it is in the southeastern United States.

The goblet provided with a drinking tube, illustrated in Figure 50, seems to be of a shape the distribution of which is limited to the Muñecas region of Bolivia. As already pointed

* A preliminary report on these excavations as well as on those carried out at Tupuraya, mentioned below, and in other parts of Bolivia, will be published in the annual report of the Gothenburg Ethnographical Museum for the year 1952 (Göteborgs Museums Årstryck).

FIG. 50. Pottery vessel from Bolivia, with drinking tube.

out, some features, however, show affinities to Decadent ceramics of the focal area of the Tiahuanaco culture, but in this area the tubular protuberance is found only on a Classic constricted neck bowl (Bennett 1934, Fig. 16, *c*; Rydén 1947, Fig. 8, *o*) and on some similar Decadent shapes (Bennett 1934, Fig. 12, *q*; 1936: 495-6, and Fig. 26, *g*). The tubular protuberances on the Classic vessels mentioned are broken off, so it is not possible to determine whether they are spouts or drinking tubes. As on the Muñecas goblets the tube on the depicted Decadent bowls is joined to the body of the vessel by a bar. This so-called spout handle is found on several Decadent bowl shapes, some of which are also met with in the marginal areas of the Tiahuanaco culture. Thus, in the Nordenskiöld collection from the Mizque valley in Bolivia there is one Decadent constricted neck bowl with spout handle from a site called Perereta and a fragment of a bowl of the same shape from the site of La Franca (Gothenburg Ethnographical Museum, coll. 15.2.25 La and 15.2.21 fl). In the collections of the Gothenburg Ethnographical Museum there are two vessels of the same shape from the Cochabamba region (28.3.9-10), from a site called Kjara-Vallea (Fig. 51, *a*, *b*). However, the bar which joins the tube to the neck of the bowl is lacking on one of these vessels (Fig. 51, *b*). When investigating some graves at Tupuraya, a suburb of Cochabamba, in 1952, I found some constricted neck bowls with a tubular protuberance, but as my collections are not at my disposal I have no information to give about these vessels except that they were found together with Decadent Tiahuanacu ceramics. Vessels derived from the Tiahuanaco spouted bowl shape are also met with in the provinces of Potosí and Chuquisaca in Bolivia. These vessels probably are of Chicha manufacture (Ruben 1952, Fig. 42, *vessel 5*; Créqui-Montfort 1906, Figs. 9(?), 11; Bini Frias 1951: 54, no. 3089). A traded Decadent Tiahuanaco vessel with tubular protuberance has also been found in northern Chile (Rydén 1944, Fig. 79, *V*). Whether the tubular protuberance on all these last-mentioned vessels is a drinking tube is uncertain. Tests on the Gothenburg vessels show that the liquid overflows the rim before coming out through the spout only when the vessels are almost completely filled.

John H. Rowe has pointed out to me the occurrence of a spouted Churajón-style vessel from Arequipa, Peru (Kroeber 1944, Pl. 2, *l*). The shapes and decoration of the Churajón-

FIG. 51. Two vessels with drinking tubes from the Cochabamba region of Bolivia.

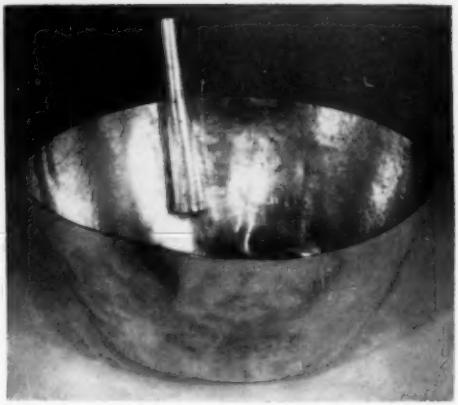

FIG. 52. Peruvian bowl with drinking tube.

style pottery show obvious Decadent Tiahuanaco influences. Some of its characteristics are also met with on vessels from Muñecas. Thus a goblet depicted by Kroeber (1944, Pl. a,G) is provided with a raised human head in the same way as the Muñecas drinking tube goblets. The net-like painted decoration on the Muñecas drinking tube goblet, Figure 50, occurs also on Churajón-style goblets of the same shape which lack the drinking tube (Kroeber 1944, Pl. 1, *F*). The painted bird, a common motif in Inca decoration, I found on at least one Decadent Tiahuanaco kero-shaped goblet when I was excavating at Tupuraya. It is also interesting to note the affinities of Kroeber's Churajón-style vessel (Pl. 2, K) and the Decadent Tiahuanaco-influenced Chicha pottery from Potosí and Chuquisaca already mentioned. Finds of this latter type of pottery made at Calama in northern Chile are probably traded pieces (Créqui-Montfort 1906: 560, and Figs. 8-11; Bowman 1908, Vol. 2, Pl. 78 *Figs. 181-2*).

Rowe has also drawn my attention to the curious, so-called "teapots" from Ancón, Nievería, and Nazca (Strong 1925, Pl. 46, *K*; Gayton 1927, Pl. 95, *a, c, d*; Gayton and Kroeber 1927, Pl. 4, *E*). He doubts, however, that there is any historical connection between this type of spout and the drinking tube vessels being discussed here. The tubular protuberance on the "teapots" undoubtedly served as a spout and not as a drinking tube, judging from the general shape of these vessels.

At the moment I am aware of only one non-Tiahuanaco or non-Tiahuanaco-influenced archaeological vessel from western South America which is provided with a drinking tube, an open bowl from Peru in the collections of the Museo de America, Madrid (Fig. 52).

Tubular protuberances also occur on Mexican and Central American vessels. Thus, in the collections of the Ethnographical Museum, Gothenburg, there is one of the spouted, melon-like vessels with handles which are characteristic of the district of Tantoyuca, Mexico (23.-6.415). Another Mexican vessel in the same collection (23.6.486) comes from Cerro de Cajetes, Vera Cruz. On the latter specimen a horizontal bar joins the rim of the bowl to the tube. A Central American vessel without the bar, in the collections of the Gothenburg Ethnographical Museum (51.25.42), was found in the department of Usulután, San Salvador. Another vessel (Fig. 53) in the same collections (39.44.138) from San Miguel, San Salvador, is interesting as its shape does not permit the use of its tubular protuberance as a spout until the level of the liquid in the vessel is level with or below the point of the perforation on the side of the vessel. Even so, the vessel must be handled with care as the liquid will easily

FIG. 53. Vessel from San Salvador with tubular protuberance, either spout or drinking tube.

overflow the rim. From northwestern Honduras, Strong, Kidder, and Paul (1938, Figs. 18, *m*, 25) and Yde (1938, Fig. 49, *a*) report three other examples of spouted Central-American vessels. The tubular protuberance on the vessel published by Yde serves no practical purpose, as the side of the vessel is not perforated (information from Yde in letter of July 28, 1953). Several shapes of spouted vessels were found by Lothrop (1942) at Coclé, Panama. He also reports a spouted vessel from the province of Veraguas, Panama (Lothrop 1950, Fig. 16, *a*). It is very likely that a closer examination of Mexican and Central American spouted vessels will show that the tubular protuberance, on at least some vessels, is not a spout but a drinking tube. Tests on the vessels in the Gothenburg Ethnographical Museum, apart from the vessel in Figure 53, have not given any definite results.

Already the scattered examples of the pre-Columbian occurrence of the drinking tube on goblets and a golden bowl in western South America mentioned here show that we must assume a greater distribution of that cultural element than was earlier supposed. It is now likely also that the so-called spout on other types of vessels in western South America and on Central American and Mexican specimens should be labeled "drinking tube" instead of "spout" and that many of the bone and wood tubes found in Peru, Bolivia, northern Chile, and northwestern Argentine may have been used as drinking tubes.

A desire to avoid floating remnants of the maize of which the chicha was prepared may have inspired the use of the drinking tube.

The use of the drinking tube outside of America has been studied by Lindblom (1941) and Berg (1941).

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ETHNOGRAPHICAL MUSEUM
Gothenburg, Sweden
October, 1953

THE FREDERICK WEBB HODGE PUBLICATION FUND

To honor Dr. F. W. Hodge in 1936, on the completion of his fifty years of service to Anthropology, a number of his colleagues united to establish the Frederick Webb Hodge Anniversary Publication Fund for the publication of worthy manuscripts of archaeological or ethnological interest.

The first to appear was "The History of Hawikuh" by Dr. Hodge himself; then four other works were published under the original plan. In 1950 the survivors of the original Sponsoring Committee transferred to the Southwest Museum the entire management of the Fund, and one book has been published since.

However, the annual income from the Fund, about $300 from a present capital of some $8,300, is insufficient for publication; and the only other available fund of the Southwest Museum pays merely about $40.00 per year. Moreover, the costs have risen greatly, hence more money must be obtained if this good work is to continue.

The greatest honor we could give Dr. Hodge who is still active after 68 years of service would be to make the Fund bearing his name large enough to be really effective.

Each subscriber will receive future publications, each volume being charged against his contribution as long as it lasts. Such charges will be made at a discount of 10% from list prices. This arrangement will apply also to former subscribers with unexpended balances. Subscriptions should be sent to the Southwest Museum, Highland Park, Los Angeles 42, California.

Two manuscripts are already in sight for publication; "Music of the Maidu Indians of Northern California" by Dr. Frances Densmore, which is finished; and "A Pinto Site Near Little Lake, California" by M. R. Harrington, now in preparation. Doubtless there will be many others.

BYRON CUMMINGS — 1860-1954

Professor Byron Cummings adopted archaeology in 1906 and taught archaeology for the next 32 years. He was not a "trained" archaeologist; he learned his subject the hard way, by personal experience and observation. Ending a long life in the service of others, he died May 21, 1954, in his 94th year, at his home near Tucson, Arizona.

Cummings' interest in archaeology was accidental. It had its beginning in the summer of 1906 while guest of a student on a casual trip through Nine Mile Canyon (locally known as the Minnie Maud), on the northern border of Carbon County, east central Utah. That trip may have been prompted by a then-current Salt Lake City newspaper campaign in opposition to plans to dismantle certain Utah cliff dwellings and remove them to Colorado as tourist attractions. Since the ruins were on the public domain Governor Cutler appealed for Federal intervention and, as evidence, mailed a sheaf of newspaper clippings to the Department of the Interior in the spring of 1906. Those clippings obviously provided timely support, for, on June 8, the Congress passed an "Act for the Preservation of American Antiquities." Twenty-one days later an Act creating the Mesa Verde National Park was approved.

Inherently opposed to such desecration as that contemplated, Cummings took an active but unobtrusive part in the newspaper campaign. Head of the Department of Greek and Latin at the state university, he saw in Utah's cliff dwellings a chapter of human history less spectacular, perhaps, but just as real as that recorded in the ruins of Greek and Roman temples. With the cooperation of friends in the city he organized a Utah chapter of the Archaeological Institute of America. Under auspices of this society, with federal permits obtained through the School of American Archaeology, Santa Fe, a branch of the Institute, he led annual expeditions into southeastern Utah and northeastern Arizona from 1907 through 1915, with the exception of two summers (1910 and 1911) when in Europe on sabbatical leave. To provide space in which to repair and display specimens acquired on these expeditions, two rooms were allotted on the third floor of the university's library building. Here informal lectures were given each fall and winter to groups of public school teachers, students, and others.

In a history of anthropology at the University of Utah, Elmer R. Smith (1950) attributes Cummings' enthusiasm for archaeology to Professor Henry Montgomery's local collection back in 1893 but this is incorrect. Cummings joined the Utah faculty in the autumn of that year; Montgomery was professor of geology at the time and the collection in his custody was a miscellaneous lot, chiefly mineralogical and archaeological. His archaeological specimens were primarily the product of his own excavations in various parts of the state during 1890-1892 (Montgomery 1894). Cummings may have lingered over Montgomery's curios from time to time but he first became genuinely interested in Utah archaeology in the summer of 1906, as previously stated.

The present writer was among the university students accompanying Cummings on his field trips of 1907, 1908, and 1909. The first of these had for its principal objective the surveying of three natural bridges in White and Armstrong canyons, San Juan County, publicized two years previously by the Salt Lake Commercial Club. Maps and archaeological information resulting from that survey were transmitted to the Department of the Interior, through the School of American Archaeology, and formed the basis of President Theodore Roosevelt's proclamation of April 16, 1908, creating the "Natural Bridges National Monument" (Cummings 1910a: 12).

(Continued on next page)

In the summer of 1908 we excavated part of a large ruin on Alkali Ridge (Kidder 1910) and thereafter forded the San Juan River for our first venture into northeastern Arizona. John Wetherill met us at Bluff City and the trading post he had established at Oljato two years before was to be our base of operations. But "Indian trouble" was at the boiling point and Wetherill was needed as consultant and interpreter. Mounted troops had come from Fort Wingate to quell a threatening extension of hostilities initiated over on the McElmo by Bya-lilli and his renegades; Col. (later Maj. Gen.) Hugh L. Scott was present as judge advocate. After tension had lessened and the troops had withdrawn, we moved out to nearby Segie and Segie-ot Sosie canyons for hasty inspection of their caves and ruins. Time for exploration farther afield was lacking.

It was at Oljato at the close of the 1908 season that Cummings learned from Mrs. Wetherill of a huge natural bridge somewhere in the vicinity of Navaho Mountain. He requested her to send word to the Navaho Indian who had reported the feature and engage him as guide for a search party the following June. The story of the discovery of Rainbow Bridge on August 14, 1909, has been told elsewhere (Cummings 1910a; 1910c; 1952: 39-45; Judd 1927) but far too little has been written of archaeological exploration that same year. While awaiting the convenience of John Wetherill, who was a paid guide during such time as he could spare from his business, Cummings returned to the Segie and Segie-ot Sosie to continue his observations of the year before. During the course of the season we visited cliff dwellings known to Wetherill and were the first white men to see Betatakin, Inscription House, Ladder House, and other ruins. I was present at the discovery of Betatakin and Ladder House but was not in the party that found Inscription House.

Inscription House was discovered early in July, 1909. With Cummings at the time were his son, Malcolm, his photographer, Stuart M. Young of the University of Utah, Mr. and Mrs. John Wetherill, and their daughter, Ida. It was Ida and Malcolm, youngsters of 10 or 11, who actually unearthed the old Spanish inscription (Cummings 1952: 26). During October, after we students had returned to school, Cummings examined a number of small ruins near Kayenta and then rode over to the Beef Basin country northwest of Moab, Utah, and returned in December to excavate Betatakin (Cummings 1952: 11, 22; Judd 1930).

Hargrave (1935) quotes from a letter in which Cummings names the areas of his explorations from 1907 through 1930. It is an incalculable loss to Southwestern archaeology that much of this field work remains unrecorded as to details. Cummings never found the necessary leisure for writing. Teaching and administrative responsibilities crowded every daylight hour and diverse other obligations constantly intervened. He retired from the classroom in 1938 and looked forward to completion of various reports but, first, there was the unfinished commitment at Kinishba. When failing sight brought its warning in 1946 he returned to Tucson determined to put all else aside but the writing. And then, while awaiting completion of a new home, his notes, his library, and other treasured possessions temporarily stored in the garage were all lost when fire destroyed garage and contents in the spring of 1949. Undaunted, he continued on the trail he had marked for himself and completed a number of manuscripts two of which have since been published: *Indians I Have Known* (1952) and *First Inhabitants of Arizona and the Southwest,* issued September 19, 1953, on the eve of his 93rd birthday. A list of his papers written between 1910 and 1945 appears in *For the Dean,* a volume of essays in anthropology by 22 former students, published in 1950 in partial tribute on his 90th anniversary.

Cummings' early archaeological observations were summarized in the second of his Utah bulletins. Although here his findings are rarely identified with a specific ruin, he remarked the dual occupancy of many caves and distinguished between the so-called cliff dwellers and their predecessors. He recorded distinctive cultural traits or the lack of them, including absence of major cemeteries south of the San Juan. If he failed to recognize "the very early population" as Basket Makers let it be remembered that this designation was then virtually unknown. It remained for Kidder and Guernsey, with field work beginning in 1914, to direct attention to Pepper's neglected pamphlet of 1902 and on the basis thereof to analyze the prehistory of the Segie area and arrange its laminations in proper sequence.

From his very first paper Cummings sought to interpret archaeology for the layman. He

wanted both his students and their parents to see what he had seen, to be inspired as he had been. No matter what the field of his investigations — the Roman Forum, the lava-covered pyramid of Cuicuilco in the Valley of Mexico, or great caves deep in Arizona canyons — he saw parallels with daily life at home. A deeply religious man, he found a sermon in every ruin, in every broken bowl. His *Ancient Inhabitants of the San Juan Valley*, printed while he was in Europe, may philosophize too much for some readers but it is packed with information for those capable of extracting it.*

Byron Cummings was born in Westville, Franklin County, New York, September 20, 1860. He was graduated from Oswego Normal College in 1885, received his A.B. from Rutgers College in 1889, and an A.M. in 1892. He taught Greek and mathematics at Rutgers Preparatory School four years and went to the University of Utah in the fall of 1893 as instructor in Greek and Latin. In 1895 he was appointed full professor and head of the department. During the years that followed he served also as Dean of Men, 1905-1915, and as Dean, School of Arts and Sciences, 1906-1915. He pursued graduate studies at the University of Chicago in 1896 and at the University of Berlin, 1910-1911. With 16 other faculty members he resigned in protest over administrative policies in 1915 and was promptly invited to the University of Arizona to organize a department of anthropology and to develop a neglected local collection into a state museum.

He was a member of the University of Arizona faculty 23 years, 1915-1938, and, in addition to his teaching and his duties as museum director, he served both as Dean of Men and as Dean of the College of Letters, Arts, and Sciences from 1918 to 1921. He was twice designated Acting President, in 1921 and again in 1927-1928. Although he retired in 1938 with the title of Director Emeritus of the Arizona State Museum, he promptly moved to the Fort Apache Reservation to resume a program of excavation and restoration he had begun seven years before.

Cummings was a member of various scientific and educational bodies and of several Greek letter fraternities. Arizona awarded him an LL.D. in 1921 and his alma mater, now Rutgers University, honored him with the degree of Doctor of Science in 1924. But the title that pleased him most, I am sure, was that of Dean. To hundreds of devoted students on two university campuses he was respected as the Dean and it is as "The Dean" that he is still affectionately remembered by those same students, now scattered the world around. For he was not only an inspiring teacher but one sincerely concerned with the welfare and well-being of his students. He was a magnet to all young people. He was especially proud of those students in anthropology who had gone out to become leaders in their several fields. Utterly selfless, considerate and tolerant at all times, he was one of those rare individuals who lived for others. As a man of vast warmth and understanding, as a teacher, and as a staunch friend in the city or out upon desert trails, he had no peer. The Dean has gone! His like can never be again!

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* It also includes several annoyingly misplaced lines in consequence of a printer's carelessness. Correction may be realized by (a) transferring the 1st and 2nd lines, p. 4, to the bottom of the page; (b) inserting the 4th from last line, p. 44, as line 3 on p. 45; (c) transposing the 3rd and 4th lines from the bottom, p. 45.

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NEIL M. JUDD

EARNEST ALBERT HOOTON — 1887-1954

On the afternoon of May 3, 1954, Professor Earnest A. Hooton, Department of Anthropology, Harvard University, suffered a heart attack and died. This premature and unexpected death has deprived anthropologists of a brilliantly effective teacher, an able scholar, and a most kindly and charming personality. In his tenure at Harvard, from 1913 to 1954, Hooton early distinguished himself as a masterly lecturer and further succeeded in carrying his engaging style over into the writing of many substantial books and articles. In the most famous of his major works, *Up From the Ape*, it is possible to find the major themes and interests of his life. These range from splendid descriptions and analyses of fossil man, primate relationships, and racial distributions to human constitution. The latter he titled "The Anthropology of the Individual" and in this he expressed his concern for the welfare of the individual and the desire that constitutional anthropology might provide a guide to a successful and useful life. Having combined a concern for the individual person with an erudite and comprehensive knowledge of anthropology, it is understandable that Hooton became an influential and distinguished teacher.

Earnest A. Hooton was born in Clemansville, Wisconsin, on November 20, 1887. His father was a Methodist clergyman. One apparent result of the influence of his father was demonstrated in his lectures on evolution. He considerately reassured students who might feel some conflict between scientific views regarding the origin and development of man and their religious training. He informed them that they were under no compunction to shift beliefs or alter conceptions concerning the world of man which might well prove to be of greater functional significance in maintaining their psychological stability. Hooton took training in the classics

(*Continued on next page*)

at Lawrence College (A.B., 1907), continuing these studies at the University of Wisconsin (A.M., 1908; Ph.D., 1911). Lawrence College conferred an honorary Sc.D. upon him in 1933. He also received an honorary degree from the University of Wisconsin. From 1910 to 1913 Hooton was a Rhodes scholar. He received a diploma in anthropology, 1913, and a B.Litt. in 1913 from Oxford. It was during this period that he came under the influence of such persons as R. R. Marett and Sir Arthur Keith. In 1913 Hooton accepted an instructorship at Harvard University and also the position of Curator of Somatology in the Peabody Museum.

His first studies were in the field of archaeology. He gradually increased his interest in physical anthropology but continued to offer courses in archaeology and ethnology, though eventually his research lay exclusively in physical anthropology. He was at first the only teacher of physical anthropology in the United States and remained the foremost teacher to his death.

Hooton made many contributions which have had a lasting effect on the interests and researches of anthropologists. His own interests in problems ranged from studies of skeletons collected by archaeologists to the medical and military applications of physical anthropology. His classic study of the skeletal material from Pecos Pueblo demonstrated the way in which a population may change in successive periods of time. His analysis of the skeletons from the sacred cenote of Chichen Itza, in which he demonstrated the varying age and sex of the sacrificial victims, was one of many contributions to a more complete understanding of the archaeology of an area. Through such studies as these he stimulated archaeologists to use skeletal materials in deciphering history and relationships. He was one of the first persons in the world to immediately appreciate the evolutionary significance of the South African Man-Apes. His analysis of the prerequisites of erect posture and its consequences for the development of human beings was a major point in his lectures and this interest has been diffused to many other anthropologists.

Hooton again was one of the first anthropologists to appreciate the existence of occupational differences in physique. In his huge study, *The American Criminal*, he noted the fact that physical differences often accompany cultural differences. Concerning the causal nature of the relationship he was convinced that this was a major area of research, not of dogmatism, and observed that studies of human constitution which permitted a greater examination of each individual would make a substantial contribution to this problem. In his anthropometric and constitutional studies he employed statistical analysis and encouraged the use of statistics among many American anthropologists.

Concerning his many personal abilities, one in particular must always be mentioned. He frequently referred to the necessity of a "morphological eye." By this he meant the trained ability to distinguish the major features of race, sex and age in skeletons and a sensitivity to physical proportions and variants. He himself was clearly an artist in identification procedures and his system of training was ideally designed to impart this ability to students. In the training of graduate students Hooton displayed a remarkable ability to locate the major talents of each student and to encourage him to pursue his own special interests in the light of them. Hooton himself was never prejudiced against new ideas. He facilitated the studies of his candidates who often went into quite diverse fields within physical anthropology. On week days he served tea at his home and issued a standing invitation to students and professors. These afternoon gatherings provided memorable opportunity for students to learn of each other's activities, to meet with visiting anthropologists, and also for Hooton to keep himself informed.

Professor Hooton was honored with the Viking Fund Medal in Physical Anthropology for 1947. He was a member of the National Academy of Sciences, the American Philosophical Society, the American Academy of Arts and Sciences, and other scientific societies. Though he frequently expressed doubts in referring to the possible existence of absolute truths, his membership in the ranks of those who have founded and given direction to anthropology is an "eternal verity."

W. S. LAUGHLIN

EDITOR'S NOTE: A complete bibliography, including Hooton's archaeological contributions, appears in the September issue of the *American Journal of Physical Anthropology*, Vol. 12, No. 3.

FACTS AND COMMENTS

COMMENTS ON ROUSE'S ARTICLE ON THE AREA CO-TRADITION

I have read Irving Rouse's recent article on the Southwestern co-tradition ("On the Use of the Concept of Area Co-Tradition," *American Antiquity*, Vol. 19, No. 3, pp. 221-5, 1954) and I must say that it fills me with mild astonishment. I fear that Rouse's strictures may have generated confusion in the minds of some students and may have given rise to the suspicion that any general formulation of Southwestern culture history is invalid or at least premature. In order to dispel these doubts I wish to discuss our underlying philosophy in this matter.

My general reaction to Rouse's article is to ask whether Bennett really intended the co-tradition concept to apply only to Peru? Has Rouse correctly codified Bennett's idea of a co-tradition and is Rouse's strict interpretation a proper one? If an affirmative is the response to these queries, then I must admit that in the narrowest and most literal terms the area co-tradition cannot be applied to the Southwestern area of the United States. At best, it would apply only to a few spots in the world in which the highest cultures have developed.

But, even if I accept Rouse's limited reading of this philosophy, is it desirable to restrict the idea of a co-tradition in this manner? Obviously, I think it is not. For a long time in my teaching, lecturing, and writing I had sought for a conceptual scheme that would make it possible to interweave the strands of the several Southwestern traditions or cultures so as to create a fabric that would represent the subtle interrelationships that I sensed. When I read Bennett's article on the Peruvian co-tradition I was happy, for here was what I had been groping for.

My archaeological interests in the Southwest have been dual: one was to set up a sound and sequential classification based on all available evidence; and the other, to seek out traits common to the several Southwestern subcultures. Periodically, I have tried to formulate comparisons that would help us analyze limited similarities and parallels in order to seek out recurrent causal relationships. This second interest might help us to develop a "culture type" — an abstraction that is needful for determining regularities in studying cultural evolution.

If Bennett's co-tradition cannot be applied to other less highly evolved cultures, then I think we must develop a design or plan that will help us in our study of culture history, cultural evolution, and cultural processes. I think Bennett's plan can be modified to fit other areas and that is what we tried to accomplish. I am strongly of the opinion that there are genuine and meaningful similarities between the several cultural traditions in the Southwest. This opinion is based on 25 years of field work and research, all of which have impressed me more and more with these manifold similarities, with variations, and with parallels of forms, functions, and sequences in the several traditions. I think, therefore, that these observations not only have validity but may be formulated in a limited way so as to point out recurrent causal relationships. The tentative formulation of the Southwestern type of co-tradition that we published has at least sharpened our wits and our awareness and has made us more perceptive, more conscious of obligations and opportunities.

I do not want to wait until all the digging is done to explore the regularities in Southwestern culture history as a whole. I want now to make what limited generalizations we can, because by setting up a modest hypothesis we can more easily discern what problems are unsolved, what needs to be investigated and what data are lacking. In short, we can make our archaeological activities more purposeful. I think the scheme we set forth, though perhaps misnamed and not conforming to the limited interpretation set forth by Rouse, was a step in the right direction. We shall welcome a better hypothesis when more data are available.

This, then, is what we had in mind when we devised the Southwestern co-tradition.

Paul S. Martin
Chicago Natural History Museum
Chicago, Illinois
April, 1954

QUANTITATIVE ANALYSES OF ANCIENT PERUVIAN METAL

In January, 1927, soon after my return from an exploring expedition in Peru under the Chicago (then Field) Natural History Museum, I arranged with Dean Frank H. Probert of the University of California College of Mining for quantitative analysis of samples from 17 specimens of ancient Peruvian metal objects selected by me from the Max Uhle collections in the University's Museum of Anthropology. Professor Walter S. Morley kindly undertook to make the analyses in person. On February 26, the last of the specimens were returned to the Museum, and soon after that Professor Morley turned over to me a typewritten sheet giving the proportions, to a hundredth of a per cent, of copper, tin, antimony, arsenic, zinc, lead, gold, silver, and silica or insoluble materials determined.

I filed the sheet, but when next I went to use it, it could not be found. Neither Morley nor Probert any longer possessed a copy by then, and both of them have since died. After some twenty years, the lost sheet turned up where it had been vainly looked for — among memoranda on Peruvian archaeology: it had slipped under the clip onto the back of a batch of manuscript notes. It seems wisest to publish the analyses before they can be mislaid again. In their general trend, they agree with Root's subsequent and mainly qualitative

spectroscopic findings of 1949 on the Uhle collections; but in details they occasionally differ.

From Mochica Site F, the Moon Huaca at Moche

Ten objects of indubitable Mochica origin were analyzed. Of these, 8 were from individual graves in the base of the Moon pyramid and 2 from the vicinity of this built-over cemetery.

Specimen 4-2850 consisted originally of a necklace of 34 hammered copper heads, cleft, probably rattles or bells, one of which was sacrificed in the analysis. Three others — 2 of them patinated, one electrolytically cleaned — are shown in Kroeber 1944, Plate 47, *a*, *b*, *c*. The height ranges from 35 to 38 mm.; but the weight varies between 24.8 and 43.4 grams, suggesting that the sheet copper used varied in thickness in the ratio of 1 to nearly 2. The weight of the analyzed piece was 29.5 grams. The percentage of copper was 96.5. No other constituents were reported, except zinc 1.0, and "Insoluble or SiO_2" 0.13, leaving 2.37% unaccounted for. (The zinc was noted as "Tn," no doubt a typist's misreading of Zn.) Zinc is uncommon in ancient Peruvian metal objects. Root (1949), using sometimes qualitative spectroscopic and sometimes analytic examination, detected presence of zinc (misprinted "An"!) only once in over 400 samples and omits it from his tables (p. 10). The 17 analyses made by Morley in 1927 report zinc 3 times, in quantities from 0.4 to 2.0%.

4-2851 is a heavy chisel shown in Kroeber 1944, Plate 48, *b*. It was in war-time secret storage in 1944; it weighs 501.5 grams cleaned, and is 162 mm. long. It is the most nearly pure copper of the 17 pieces determined: 99.74%. The only other constituents noted are: gold 0.13, and insoluble or silica 0.7, with only 0.06 not accounted for.

The remaining Mochica objects are from individually excavated graves and therefore have known assemblies of ceramic and other associations.

4-2922, from grave 11, is a cast oval ingot mentioned in Kroeber 1944, page 129, and pieces similar to it are shown in Plate 47, *m*, *n*, *o*. It is nearly as pure as the last: Cu 99.57, Sn 0.2, Au 0.2, Ag tr, unaccounted for 0.03.

4-3290, from grave 26, where it lay in a hand of a skeleton, is an ingot weighing 128 grams. Cu 98.9, Ag 0.42, As 0.1, insoluble or SiO_2 0.08, unaccounted for 0.59.

4-3110, an ingot from the mouth of the skeleton in grave 19, weighs 130 grams, and runs Cu 98.53, insoluble or SiO_2 0.07, Ag 0.04, unaccounted for 1.36.

4-3324 is a fourth ingot, weighing 64.9 grams, again from the mouth of a skeleton (in grave 29), but is copper-gold alloy with a good dash of silver: Cu 62.9, Au 27.64, Ag 9.3, insoluble or SiO_2 0.21, total 100.5 (*sic*).

4-3294, weighing 35.5 grams, from grave 26, is a fragment of a cogged disk (Kroeber 1944, Plate 47 *e*, *f*, *g*) and may have served as an ingot also. The analysis gave only 98.04 of Cu and 0.06 of insoluble or SiO_2, with trace of Ag, or total of 98.1. The deficiency may be accounted for by the notation: "very porous and gritty."

4-3296, also from grave 26, where it was deposited in the mouth of a human body, looks like a fragment of a notched cylinder, and is shown in Kroeber 1944, Plate 47 *k*. It weighs 108.2 grams and is porous as if cast in sand. The composition again is nearly pure copper: Cu 98.64, As 0.1, SiO_2 or insoluble 0.1, unaccounted for 1.16.

A second chisel, 4-3394, from grave 32, is much narrower and lighter than 4-2851, weighing only 19.5 grams; Cu 95.7, Au 0.35, insoluble or SiO_2 0.13, Ag tr, unaccounted for 3.72.

4-3095, from grave 17, is a scraper-like, broad-bladed instrument weighing 27.5 grams. Here the deficiency from 100% is even greater, 5.66%, so that one suspects a figure mistyped: Cu 91.9, Zn 2.0, Au 0.2, insoluble or SiO_2 0.14, As 0.1, Ag tr, total 94.34. The 2% of zinc reported is surprising.

From Tiahuanacoid Graves in Sun Pyramid, Moche

These graves were on the upper south platform of the great structure, and constituted Site Moche A in Uhle's description and cataloging. They contained Tiahuanacoid pottery and artifacts, but Tiahuanaco bodies may have been put into extant earlier Mochica tombs, or the later graves may have been intruded into the platform.

4-2610e, "copper fragments" weighing 86 grams, contain more silver than any other object analyzed by Morley. They also are one of 4 specimens containing tin. The analysis gave: Cu 86.9, Ag 11.3, Sn 1.02, As 0.1, unaccounted for 0.68. There are about 5 fragments, some of thin sheet folded or bent over, others sturdy. It is one of the latter that was cut to furnish the metal for assay. One or two of the thin pieces gleam a bit whitish on the convexities as if they might contain more than 1/9 of silver.

From Chulpaca, in the Valley of Ica, Middle Ica in Period

Three specimens from site M, Chulpaca, in the Valley of Ica, near the south-central coast, are of Middle Ica period, post-Tiahuanacoid but pre-Inca. These 3 pieces were subsequently analyzed by Root (1949), and are shown in his Figure 10, *a*, *b*, *c*. They are: 4-4444A, a disk 136 mm. in diameter, now weighing 304.1 grams, containing a central hole surrounded by 11 smaller ones, called a club head by Root; 4-4445, an ax-like object, 105 mm. long, half as wide, weight 328.3 grams; and 4-4446A, listed by Root as a mirror, but more likely the rounded head of a shawl pin, 116 by 94 mm. and 0.7 mm. thick and weighing 53 grams originally according to Root; or, in 1953, around 115 mm. in maximum diameter, an average of perhaps 0.8 mm. thick, and weighing 48.4 grams.

Root calls all 3 pieces copper, and lists a "small" proportion (1/20%) of silver for the first one only. Morley also makes them almost pure copper, except that

2 of the pieces contain the highest percentage of insoluble or SiO_2 — that is, non-metallic ingredients — which he reports. His analyses are as follows:

	Cu	Insol.	Ag	Au	As	Total
4-4444A	98.43	0.28	tr	0.1	—	98.81
4-4445	99.46	—	—	—	0.1	99.56
4-4446A	97.66	0.40	0.18	—	0.1	98.34

Presumably Inca Period, from Rio Grande Drainage

Uhle presumably did not excavate these pieces, but bought them in the vicinity of Nazca. 4-8790 has no further provenience; it is a heavy T-shaped ax of 1604 grams, 134 mm. long, shown by Root in his Figure 21 *i*. 4-8612 and 4-8611 are smaller and lighter T-axes, 105 and 89 mm. long and 153.9 and 334.6 grams in weight, and come from Trancas on the Tunga, the most southerly affluent of the Nazca and Rio Grande. The shape of these axes is highland; and the Incas had a station at the southern edge of the valley, at Poroma on the Tunga, as shown by the remains there. One would thus expect these axes to be of bronze. Root however calls them copper, and does not credit them with any tin (nor silver or gold), although in the same Table 22 he gives, for 6 other Inca-period objects from Chala on the coast south of Nazca, and from Cochahuasi in Cuzco Valley on the road to Pisac, "small" (1/20%) proportions of tin and traces of silver.

Morley's quantitative analyses come out otherwise, and the three pieces differ among themselves in composition:

	Cu	Sn	Sb	Zn	Au	Ag	As	Insol. SiO_2	Total
4-8790	96.06	2.88	0.25	0.4	0.13	tr	0.1	—	99.82
4-8611	93.25	5.1	0.6	—	0.15	0.88	—	—	99.88
4-8612	91.78	—	—	—	—	—	4.6	0.08	96.46

It appears that 4-8790 and 4-8611 agree in containing tin, antimony, gold, and silver, although the proportion of these alloys or impurities is about twice as great in 4-8611 as in 4-8790. But 4-8612 differs from its Trancas mate in that none of these metals are reported, but that it contains almost as much arsenic as 4-8611 has tin. It would seem that in default of tin, an ore of copper containing arsenic was used for hardening.

Root has shown that where Inca influence was strong or direct, tin-bronze might be used, but that the bulk of the Ica and Chincha population, poor or prosperous, used only copper unalloyed with tin even under Inca domination (Tables 19, 21). The same now seems to hold for Nazca.

The Metals Used

The pieces analyzed were all "coppers," and the percentage of this metal does not fall below 91, except in two cases. These are a Mochica period ingot roughly Cu 63, Au 28, Ag 9 and the Tiahuanacoid period specimen 4-2610e (also from Moche in the North) which is Cu 87, Ag 11, Au 0, but reported also to contain 1% of tin. These 2 pieces are undoubtedly sought alloys.

All the other Mochica pieces are essentially pure copper, except that a scraper (4-3095) and a bell (4-2850) are credited with 2 and 1% of zinc. This finding needs verification. Root detected zinc only once in hundreds of specimens from southern Peru.

Morley found no lead in any of his 17 pieces.

Tin is undoubtedly present by design in 2 of the 3 Inca period axes, and the 1% of it in the silver-alloyed copper 4-2610e of northern Coast Tiahuanaco period may also be intentional. Its one other occurrence, 0.2% in a Mochica ingot, is presumably an accidental impurity.

Arsenic was reported present in nearly half the cases by Morley. In one Inca-period ax it replaces tin; in 7 other cases the amount is only 0.1% and non-significant as to intent.

Antimony occurs twice, wth 0.6 and 0.25%, in accompaniment with a tin content of about 5 and 3% respectively.

Gold is present once, in Mochica, as a 28% alloy. Otherwise, it occurs 7 times out of 15, in minute proportions of 0.1 to 0.35%.

Silver is the most frequently occurring metal, next to the basic copper. It occurs twice as an alloy of 11 to 9%, in Tiahuanacoid and Mochica; twice in strength of 0.88 and 0.18% in Inca axes; twice in Mochica ingots (0.42 and 0.04%); 6 times as trace; and is wholly lacking only 5 times.

Kroeber, A. L.

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A. L. Kroeber
University of California
Berkeley, California
November, 1953

A SMILING HEAD COMPLEX FROM CENTRAL VERACRUZ, MEXICO

Various authors in the past have speculated on the epoch and culture to which the so-called "Laughing Faces" belonged. But with only a small number of sporadic finds they have not been able to explain satisfactorily their origin, cultural epoch, symbolism, or typological evolution. There exist, however, some useful works on the subject, such as those by Phillip Drucker, C. W. Weiant, J. L. Melgarejo, Vladimiro Rosado Ojeda, Alfonso Medellin Zenil, and Fredrick Peterson.

In the fall of 1952 the antiquity market of Mexico City was suddenly flooded with sculptured pieces of which the "Laughing Faces," or "Smiling Heads," formed the chief part. Their source was made known when the Presidente Municipal (Mayor) of the village of Joachin, in the municipality of Tierra Blanca, Veracruz, denounced illegal excavations in his territory. The looting of the archaeological zones had taken place in the small communities of Los Cerros and Dicha Tuerta. The Department of Anthropology of the State of Vera

Cruz decided to send its technical staff to the site of the depredations. Alfonso Medellin Zenil was in charge of this excavation and Roberto Williams was field assistant. Fortunately they arrived in time to save the greater part of the deposits, and to excavate them properly.

The deposits proved to be dumping places or rubbish heaps of extraordinary richness, both in quantity and quality of the artifacts discovered. Until this find only half a hundred of these smiling heads existed in public and private collections. About 800 pieces from the excavations are now in the custody of the Department of Anthropology of the State of Vera Cruz, in the city of Jalapa. Besides these, approximately 400 were sold on the collectors' market. The majority of these have been studied and photographed by Fredrick A. Peterson, under the auspices of a Wenner-Gren Foundation grant-in-aid. This study was united with that of Alfonso Medellin Zenil to make the present article.

The two archaeological zones are found in the southern limits of the semiarid zone of central Veracruz, bordering on the swampy lands of the territory of La Mixtequilla. The region is flat, with a shallow layer of soil to a depth of approximately 50 cm., under which is found *tepetate*, a sandy crumbly rock. This condition allows the growth of only more or less rachitic tropical flora.

The deposits were discovered accidentally by native farmers upon breaking soil with their plows for seeding corn. As the soil is extremely shallow, archaeological sites are in great demand for corn raising as they usually contain greater depths of soil. The rubbish heap of Los Cerros was situated in an artificial platform located on the outskirts of a small ceremonial center, between two earth mounds. This artificial platform was entirely filled with broken or discolored clay artifacts. No other material, such as stone or bone, was found. This is very significant, showing the existence of a specialized kind of rubbish heap. As the artifacts represent the expression of hierarchic art, and were sacred objects, we conclude that this deposit is composed of material which had been broken or discolored in the baking process, rejected, tossed into a pile, and covered with earth. The rubbish heap of Dicha Tuerta was also located on the periphery of a small ceremonial zone, and was restricted to a small decline next to an earth mound.

Excavations were first begun at Los Cerros, removing the earth that the pot hunters had explored, leaving the holes clean to take advantage of the untouched deposits. Contiguous stratigraphic pits were extended until the site was completely cleared of ceramic remains. A total of 347.50 sq. meters were explored, of which 45.50 sq. meters belonged to Trench No. 1, made in one of the two mounds. The excavation at Dicha Tuerta was made in two pits, which also completely cleared the rubbish heap, for a total of 89 sq. meters.

In the field catalog, careful note was taken of the stratigraphical position of each piece or group of pieces, as well as their relationships to local and imported ceramics. Here we will mention only the most important results, leaving the detailed report to a monographic study. This discussion is naturally hampered by the fact that only clay artifacts were found in these deposits. A definitive study of the smiling head complex should, of course, consider all possible related materials.

The typological antecedents of the figures discussed here were found in the excavations of Remojadas (Medellin 1951), and Loma de Los Carmona (Medellin 1952). These belong to the period termed Remojadas Superior I or the Early Classic horizon of central Veracruz. (Fig. 54, *E*). They are mold made and in the form of whistles, and rattles, with much appliqué ornamentation. In the lowest layers of Los Cerros and Dicha Tuerta appeared some artifacts which show a striking relationship to those of the above mentioned sites (Figs. 54, *F*; 56, *O*, *P*).

Approximately 75% of the total number of artifacts found belonged to the smiling head or laughing face type. They are complete masculine or feminine figures, for which the designation of smiling heads is inadequate since the heads were once attached to bodies, but as tradition has established this term it will be used here. The figures are made of a sandy clay, basically brown or reddish-brown in color, with yellow, red, gray, and orange variations. The paste is soft and crumbly. It is possible that the majority of these figures were once covered with a polished slip of a reddish-orange color or a creamy-white. However, this slip was so soft and fugitive that in the majority of examples only barely perceptible traces remain. On some few pieces the use of red, white, and black paint is barely discernible, over the slip.

The figures were cast in molds, with some details sharpened or added by fingers or sticks. Finger marks are visible on the inside of the figures, showing that the clay was pushed into the molds. They are made in at least two sections, front and back, with the joints perfectly smoothed. It is believed that the arms and heads were made in separate sections. The figures are reinforced at weak points with clay tubes. Some authorities have thought that the placing of a "spigot" under the head was in order to imbed the heads in the walls of temples. In reality it is a reinforcing tube which aided in uniting the head with the shoulder section (Fig. 55, *D*).

Circular or triangular holes are found in different parts of the bodies, which permitted the baking-steam to escape. This explanation, however, does not apply to the straight or curved slits and circular holes in the heads, which were probably made as points of insertion for plumage or other decorative materials.

Some masculine bodies are completely nude, while others wear loincloths (Figs. 54, *E*, *F*; 56 *O*), pectoral bands (Figs. 54, *E*, *F*; 56, *O*), necklaces, and also ornaments on the ankles and wrists. Some of the nude figures are shown grasping long locks of hair (Fig. 54, *H*). The loincloths and pectoral bands are frequently decorated with reliefs representing eagles, serpents, plumed serpents, anthropomorphic figures, geometric motifs, and

FIG. 54. Clay artifacts from Dicha Tuerta and Los Cerros. A-D, Cihuateteo; E, from Loma de Las Carmona, Remojadas Superior I; F, Chata Lisa; G, intereyebrow adornment; H, nude figure grasping hair locks; I, Tlaloc; J, Pre-Classic head; K-L, Teotihuacán III-IV types; M, Huehueteotl; N, Mictlantecuhtli; O, Xochiquetzal, Maya trade piece; P, smiling head with forehead relief of Eehecatl-Quetzalcoatl.

FIG. 55. Smiling Heads of Classic Type, Los Cerros II phase of Remojadas Superior II. A, with volute and stepped fret and right cheek incising; B, shows tooth mutilation and elaborate earplugs; C, with pelican; D, with volute; E, with monkey; F, with heron catching fish; G, full figure of heron type; H, with volute and slit; I, with interlaced design; J, with scroll; K, articulated-limb figure; L, showing protruding tongue; M, ¾ view; N-O, "Serious" figures; P-Q, male and female figures complete.

interlaced designs which resemble those of the style known as Tajin or "Totonaca scrolls." It is not clear whether these represent names, clan designations, symbols for deities, or merely ornamentation (Figs. 54, *E, F*; 56, *O*).

Feminine bodies wear skirts, pectoral bands, and necklaces. The skirts are profusely adorned with stepped frets known as *Xicalcoliuhqui*, and other geometrical forms, as well as rattlesnakes, monkeys, serpent heads and the like (Fig. 55, *Q*).

The smiling heads have been classified in accordance with their most conspicuous element, which is the headdress and its ornamentation. As general characteristics of these heads we should mention the strong cranial deformation of frontal-occipital type, indicating use of the cradle-board, the intentional dental mutilation of type A4-B4 (J. Romero 1951), and the smile. This smile is responsible for minor facial characteristics such as eye wrinkles and occasional wrinkles and dimples in cheeks and chin. The tongue often protrudes roguishly between the teeth. This may be an old greeting habit meaning "I come in peace," or, "I have nothing to hide." The smile is rarely found on Mesoamerican artifacts, as they usually represent the viewpoint of a theocratic-militaristic group, and the serious or grim expression is the reigning fashion (Fig. 55, *L*).

In the epoch styled Remojadas Superior II, or Late Classic period of Central Veracruz, two phases have been distinguished. The phase termed Los Cerros I is the earlier and includes 2 types of smiling heads. These are known as "chata lisa" and "inter-eyebrow adornment" (adorno entrecejo). The average stratigraphic depth of these 2 types, as is to be expected, is the greater. The "chatas lisas" have facial features closely grouped, on a smooth and almost flat surface, oval eyes, wide heads, and the expression seems to be a grotesque grimace rather than a smile. Adornment of the forehead is either entirely absent or in the form of simple volutes. Often a figure holds a hand up to its mouth as though to stifle its laughter (Fig. 54, *G*). The "inter-eyebrow adornment" type resembles the "chata lisa," but the planes of the face are more correct and instead of a grimace we see a full smile. A V-shaped ornament, extending from the upper part of the nose up between the eyebrows to the forehead is the distinguishing mark of this type. This ornament seems to be clipped on to the bridge of the nose, resembling some found in the Maya area (Fig. 54, *G*).

The characteristic types of the most recent phase of Remojadas Superior II, which is called Los Cerros II, are distinguished by their forehead ornamentation in relief. The designs portray herons, herons catching fish, monkeys, pelicans, iguanas, serpents, men wearing serpent headdress and labial mask, human faces, stepped frets, scrolls, interlaced designs, and various other types of elaborate geometrical decoration (Fig. 55). These figures are the culmination of an evolutive process of stylization. They are characterized by the fullness of their smiles, the realism of form, the classic simplicity of every feature, the mastery of manufacturing technique, and more specifically, the oblique or mongoloid eyes, smooth handling of facial planes and curves, better proportions, and dynamic postures. The figures are invariably adorned with ear plugs in diverse forms (round, leaf-shaped, "tiger-claw," and so on), bracelets that often have a bell attached, and sometimes one holds a rattle in his hand at shoulder height (Figs. 55, *Q*; 56, *H*). Hair is represented by parallel vertical incisions and is often shown tied up with a horizontal band. The hair is usually cut short on the forehead but sometimes locks of hair almost cover the ears. Hands are wonderfully made, very realistic, delicate, and in graceful positions (Fig. 56, *I*).

It is interesting to note that some of the smiling figures have articulated arms and legs, similar to those found in Teotihuacan III, or the Tepeu phase of the Maya zone (Fig. 55, *K*). A trait which may be shared with the Maya is the use of a string of beads dangling from the forehead between the eyes (Fig. 55, *E*). It is possible that this was used to cause artificial strabismus, as with the ancient Maya.

Among the clay sculptures which do not belong to the smiling head type but form part of the complex, similarities with the following divinities have been observed: Mictlantecuhtli (Lord of the world of the dead), Huehueteotl (the Old God—Lord of Fire), Quetzalcoatl (a Creator God, Civilization, Artisans, etc.), Eehecatl-Quetzalcoatl (God of the Wind), Xochiquetzal (the Precious Flower, Goddess of Love), Tlaltecuhtli (the Earth God), and Cihuateteo (the Divine Women Warriors). One example was found of a personage bearing rings around the eyes, a moustache-like volute above the mouth, and large fangs, which is probably a representation of Tlaloc, God of Rain (Fig. 54, *I*).

Another type of figure is that of the "babies-in-crib." All these figures show a baby, in crying or sleeping attitude, tied to a flat bed which rests on four small supports. They are all hollow and were used as rattles and whistles (Fig. 56, *U, V*). Similar figures have been found at Remojadas from the period Remojadas Inferior.

A type of figure similar to the smiling heads but of a serious appearance, called "Las Serias" (the serious ones), is characterized by extreme realism. In fact these figures seem to represent real portraits of actual people, showing exquisite plastic beauty combined with a tranquil expression (Fig. 55, *N, O*).

Numerous anthropomorphic and zoomorphic whistles were found. The former represent men and women in diverse attitudes too numerous to picture here. One feminine figure is totally covered with *chapopote* (asphalt) and wears a buccal mask. The zoomorphic pieces represent charming figures of armadillos, bats, frogs, ducks, and other kinds of animals (Fig. 56, *B, C*). Deities are often symbolized by animal forms and the great variety of animal forms present in this complex probably reflects this type of symbolism. Another group of zoomorphic figures, not whistles, show monkeys,

FIG. 56. Miscellaneous finds of Smiling Head Complex. A, E, F and G, platform with arch and monkey, with supports in monkey, geometrical, and toad form; B, fish; C, bat; D, K and Q, Mayoid whistle figurines; H-J, hands, with rattle, in graceful position and articulated; L, figurine-whistle from Campeche (?); M, early type smiling head of baby-face; N, whistle figurine; O-P, front and rear of whistle figurine from Dicha Tuerta of Remojadas Superior I type; R, untempered orange-red bowl with hollow tripod supports; S, untempered grey bowl; T, figurine-whistle covered with *chapopote* (asphalt); U, V, babies-in-cribs.

jaguars, toads and *tlacuaches* (racoon-like animals), with penis visible and often erect, probably indicating the presence of a fertility cult or rite (Fig. 56, *E, G*). These figures served as supports for large complicated platforms, surmounted by high arches on which spider monkeys are swinging. Although no complete example is known, these are important for their complexity, novelty, and for being found here for the first time in a recorded archaeological context (Fig. 56, *A*). The support shown in Figure 56, *F* probably held up the platform immediately above it.

At Los Cerros, in the lowest layer of the dump, on the surface, and in the lowest level of Trench No. 1, indicating accidental finds, 4 pre-Classic clay heads were found. One of these is identified with the type "classic pointed chin" of Tres Zapotes Inferior (Weiant 1943: 84), and another with the figures of "incised eyes and rudimentary limbs" of Remojadas Inferior (Medellin 1950), (Fig. 54, *J*). Trench No. 1 gave forth abundant pre-Classic monochrome ceramics, of sandy brown clay, with thick walls, and with polished slips of black, brown, reddish, and dark-wine. Some were decorated with incisions in geometric motifs with powdered cinnabar rubbed into the incisions, of the same type as those found in Remojadas Inferior (Medellin 1950).

On the surface of Los Cerros and in the first layer were found some ceramic fragments identified as the "stamped bottom" or Buff Polychrome of Drucker, of the Historic Horizon and also characteristic of Cuetlaxtlan and Quauhtochco (Medellin 1949; 1952). Two flat solid molded figurines were classified as Cerro de las Mesas Superior II. There was one fragment of ceramics of Quiahuiztlan II type which belongs to the Historic Totonaca period. Some of the materials of the Late Classic Horizon in these two sites contain elements that indicate relationship to, and presence of, other cultures. Rattle figurines were imported from the Maya region, probably Campeche, belonging to the Tepeu Phase or the Late Classic Horizon (Figs. 54, *O*; 56, *L*). These pieces indicate not only a simple commercial exchange or importation, but reveal a strong technological and ideological relationship with the contemporary materials of the Central Area of Veracruz (Peterson 1952).

There are a number of pieces that might be termed "Mayoid," which are of local manufacture (Fig. 56, *D, K, N, Q*). In general there are many traits which are common to both regions. We find the use of upraised hands, outstretched tongue, articulated limbs, mold making, use of figurines as rattles and whistles, babies in cribs, and elaborate headdresses in both regions.

The articulated figures, the small figurines of trapezoidal headdress (Fig. 54, *K*), and those that carry babies on the hips (Fig. 54, *L*) are similar to, and contemporaneous with, Teotihuacan III-IV. Other points of similarity with the highland region are: hierarchic stylization, baroque tendency of ornamentation combined with strong classic facial features, uniformity of dress and adornment, as well as techniques of manufacture, and the presence of the plumed serpent, Huehueteotl and other divinities.

In the dump of Los Cerros, and in Trench No. 1, smiling heads were found in association with several complete bowls and fragments of the types "Untempered Orange-red," Drucker's Untempered Ware (Fig. 56, *R*), (1943), Untempered Grey (Fig. 56, *S*), and Black-on-white, characteristic of the period Tres Zapotes Superior (Drucker 1943; Weiant 1943; Medellin 1952).

In accordance with the stratigraphic and cultural relations already expressed, and by way of conclusion, a fragment of the chronological table of central Vera Cruz is here presented (Table 6), showing the relationship to other areas.

TABLE 6.

Teotihuacan	*Central Vera Cruz Area*	*Cerro de Las Mesas*	*Tres Zapotes*	*Panuco*	*Monte Alban*
IV	(Los Cerros II) Remojadas Superior II	Inferior II	Superior	Pavón IV	IIIB
III	(Los Cerros I) Remojadas Superior II	Inferior I	Middle	Pavón III	IIIA
II	(Remojadas & Loma de Las Carmona)	———	———	Pavón II	II
I	Remojadas Superior I	———	———		

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Jalapa, Vera Cruz
October, 1953

THE OLD COPPER ASSEMBLAGE AND EXTINCT ANIMALS

There seems to be some possibility that artifacts representative of the Old Copper culture were associated with fossil animals. The evidence is inconclusive but worth noting as a stimulus for future investigations.

In his report on the geology of the Thunder Bay, Ontario, district, Tanton (1931: 83-4) mentions some interesting archaeological remains, information about which was preserved in the files of the Geological Survey of Canada. This information is as follows: in 1918, during industrial excavations, a copper spear point and about 12 mammal bones were found about 40 feet below the surface of the ground in the Kaministikwa Valley at Westfort on the edge of Fort William, Ontario.

The geological section here, according to Tanton (1931: 82) consists of bedrock and conglomerate above which is a "deposit of stratified blue clay between 60 and 90 feet thick, the surface of which has been eroded in channels, and on this uneven surface there are crossbedded sands varying from 4 to 40 feet in thickness filling up the inequalities on the clay surface and forming the plain at the present surface — 638 feet above sea level."

The copper spear point and the mammal bones seem to have been on the surface of the blue clay, and beneath the sand. In 1913, in an excavation for a sewer, many copper tools were found 800 feet north of the first mentioned locus. They also were on the clay, and at a depth of about 40 feet beneath the surface, and covered by crossbedded sands. These two finds would seem to indicate sites on or in the blue clay rather than secondary deposits in the crossbedded sands.

The copper spear point found with the mammal bones was described by Harlan I. Smith as a "point with a flanged tang" (Tanton 1931: 84). The mammal bones, according to Harlan I. Smith were identified by "Lawrence M. Lambe, vertebrate paleontologist of the Geological Survey and Mr. Sternberg, preparator of paleontological specimens" as those of "a cloven footed animal, possibly a buffalo or — domestic cattle" and of a "horse and not petrified" (Tanton 1931: 84). Tanton considered the horse bones modern, and stated, "It seems probable that the arrival of the horse in this region would be much more recent than 400 years ago, and at present it is difficult to understand how these bones could have been overlain by deposits about 40 feet thick near Westfort" (Tanton 1931: 84).

According to Bryan Patterson, Curator of Fossil Mammals at Chicago Natural History Museum, the present status of paleontological studies of horses does not permit a specialist to distinguish the larger American Pleistocene and Post-Glacial horses from modern horses on the basis of fragmentary material alone. Thus the horse bones with the copper spear could have been bones of a native horse and not those of a modern horse. According to Patterson, a somewhat similar situation obtains with repect to fragmentary bison or cattle bones. If the deposit is old enough the bones are those of a fossil bison. Thus, if the Kaministikwa site is truly ancient and the copper spear is really in association with bones of horse and bison, we have an example of an Old Copper culture artifact associated with fossil mammals. The next question, then, is the age of cultural deposits on the blue clay.

According to Tanton (1931: 82-4) the stratified clay was probably part of the delta of a large river flowing into the Superior basin through the Kaministikwa Valley. As water levels dropped in the Superior basin, the delta deposits were channeled, reworked, and contributed to new deposits extending lakeward. The sand and gravelly sand deposits covering the eroded clay surface at Westfort "were presumably laid down in the delta of the ancestral Kaministikwa River at a time when the level of the great lake, either a stage of Nipissing Great Lakes or Superior, was . . . possibly only a few feet lower" than the present plane at Westfort which now stands at about 638 feet.

The geological situation implies a period of low water level during which the blue clay was channeled and eroded, followed by a period of high water during which the sand was deposited on top of the blue clay.

At the time of Lakes Stanley and Chippewa in the Huron and Michigan basins (see Hough 1952: 71-83) there should have been a corresponding stage of low water in the Superior basin. This would have been

followed by a period of high water, the Nipissing stage, after which the lake levels dropped to their modern positions.

The Nipissing stage lasted probably from about 2000 B.C. to 1000 B.C. There are radiocarbon dates of 1705 B.C. and 1518 B.C. associated with the Nipissing stage (see Hough 1952: 90) and a date of 667 B.C. associated with the Algoma stage (see Hough 1952: 91, 93) that followed the Nipissing.

The low-water stage (represented in the Huron and Michigan basins by Lakes Stanley and Chippewa) is older than Nipissing, but younger than Lake Chicago (Toleston stage) and Lake Grassmere, which is associated with a radiocarbon date of 6562 B.C. (Hough 1952: 49). Since the low-water stage was preceded by Lake Algonquin, and the transition from Lake Algonquin to Lakes Chippewa and Stanley, all of which were later than Grassmere, it follows that the low-water stage must be much younger than 6562 B.C., but older than 1705 B.C., the earliest known Nipissing date. A reasonable dating of the maximum low-water stages would be from about 3500 B.C. to about 2000 B.C.

Thus as early as 3500 B.C. there was a possible association of horse and bison with the Old Copper culture. If this should prove to be true, it would imply that a native horse existed in the Great Lakes area during the Altithermal, a warm dry period that lasted from circa 4000 B.C. to some time around 2000 B.C.

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Chicago, Illinois
December, 1953

SOME FLUTED PROJECTILE POINTS FROM ILLINOIS

Fluted points, like many other artifacts, seem to be more common than previously thought. Once attention is called to a given item representative specimens are found in existing collections only waiting to be recognized. Smail (1951) has presented a discussion of many points of this type from the St. Louis area in Illinois.

Recently several interesting specimens have been brought to the Illinois State Museum and are here illustrated, due to their unusual combination of attributes and location. The first of these (Fig. 57) was found in Fulton County in 1924 by the late Frank Aldrich of Bloomington, Illinois. It is lanceolate in shape, 4¼ inches long, 1¼ inches wide about ¾ of the length from the base, and lenticular in cross section. Its very delicate chipping produced parallel long flake scars running from each edge to the center. The base is ground on each side and across the bottom. Another unusual feature about the point is that it has a flute running up one side for about ⅔ of the length, which veers off to one side of the center line of the blade. There is no hinge fracture at the top end of the flute. In shape and workmanship this point is very similar to some projectile points known from the nonpottery sites in the St. Louis area reported on by Titterington (1950, Fig. 2) with the exception of the straight rather than concave base line and the flute. The workmanship is a little more regular than those leaf-shaped projectile points from the F°11 as reported on by Cole and Deuel (1937: 66; Fig. 17, Pl. IV). The shape and workmanship actually find their closest similarities with the Nebo Hill material from Western Missouri (Shippee 1948, Pl. II, esp. *B, c*).

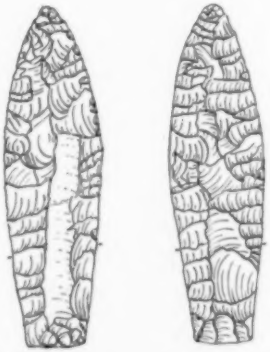

FIG. 57. Fluted projectile point from Fulton Co., Illinois (½ actual size). The marks on each side indicate the extent of basal grinding.

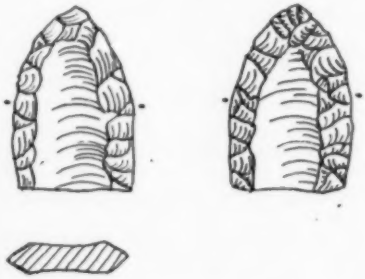

FIG. 58. Tip of fluted projectile point found at the Crable site, Fulton Co. (actual size). The marks on each side indicate the extent of basal grinding.

The second item (Fig. 58) in this report is of the tip of a fluted point collected by Dr. Dan Morse from the Crable site in Fulton County, Illinois. This site is one that is usually thought of as Mississippian (Smith 1951) but also had an earlier Hopewellian occupation. The fragment is 1⅛ inches long and ¾ inch in width. It has a broad flute on both sides running almost to the tip. It has the typical Folsom cross section and appearances. The parallel sides are ground up to the place where they start to taper to the tip. Smail (1951, Fig. 6) illustrates some points similar to this one; however, they seem to be much less common in the state than are the large fluted points similar to the Clovis Fluted points of the West (Smail 1951: 14).

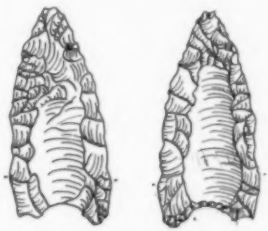

Fig. 59. Fluted projectile point found near Harrisburg, Saline Co., Illinois (½ actual size). The marks on each side indicate the extent of basal grinding.

The third projectile point (Fig. 59) was found just north of Harrisburg, Saline County, Illinois. It was brought to the Museum by Dick Hagen, Archaeologist of the State of Illinois Division of Parks and Memorials. This point is 2¾ inches in length and 1¼ inches wide. Its widest point is near the base. It has a deeply concave base and basal grinding up both sides for roughly ¼ of the length. It is much more crudely made than the other two but does have wide flutes running up both sides to about ⅔ of the length. Smail (1951, Fig. 6, bottom row) illustrates shapes similar to this in the St. Louis region.

Little more can be said regarding these projectile points at the present time. It does seem important to record them and the locations from which they came so that the data will be available for anyone in the future who undertakes the all-important task of studying the distribution of two very important Early Hunter and Archaic projectile point forms, the fluted and the lanceolate.

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November, 1953

WATERWORN AND GLACIATED STONE TOOLS FROM THE THUMB DISTRICT OF MICHIGAN

Several thousand stone tools have been found along the Imlay channel in eastern Michigan. The first were noticed in 1937, but it was not until 1952 that enough were accumulated to be very certain there was a people here before readvances of ice of the Wisconsin glaciation. The area is within that shown for the Cary Substage on the Glacial Map of North America (R. F. Flint, et al., *Geol. Soc. of Am., Special Paper*, No. 60, Pt. 1, 1945).

Opinions have varied among professionals who have seen this material, some thinking it is all natural, others, that some at least might be artificial, and George F. Carter who examined the largest sample, nearly 500 specimens, that it is all man-made. That many of these *are* artifacts could be demonstrated to anyone taking the trouble to examine the stones of this region. While many can be ruled out as possibly of natural origin, others cannot.

The Imlay channel was the outlet of Lake Maumee III, a late stage of the first glacial great lake following the withdrawal of the Wisconsin ice. The outlet of a lower stage to the east was overridden by a readvance of the ice which pushed the river up the slope to the west.

The site where the majority of worn implements has been found, is 9 miles north and ½ mile east of Imlay City, Lapeer County, along the northeast side of the channel, north of Clear Lake Road. Here the moraine and outwash plain gently slope into the channel. Another site is about ¾ mile to the southeast, on low bluffs along both sides of a creek. In 1935 this location was identified by Frank Leverett as an Imlay channel sand bar. The upper level of the channel through this stretch contains stones ranging from gravel to cobbles, and, on the northwest site, some boulders. This stratum varies in thickness from less than 2 feet to several feet. A pit dug to a depth of 11 feet on the southeast site showed only gray, waterlaid sand beneath the stony layer. Measurements in areas which have never been cultivated show less than 7 inches of topsoil. According to people who have had wells drilled or driven, bedrock (or hardpan) was reached at depths of 15 to 22 feet. Oilwell drillers say a hardpan is reached before bedrock.

This hardpan is pre-Wisconsin till. There are exposures of it and of old soils to the east near the Lake Huron shore.

There is another area nearly half a mile east of the channel along a tributary, a drainage channel from the ice front, where waterworn implements have been found on the surface and at depths to 3 feet in undisturbed levels beneath those at which the projectile point debris occurs in this region. No digging to speak of has been done below 3 feet. The upper, stony level varies more in thickness, and occasional lenses of gravel containing large stones are found in the lower levels.

At the northwest site crude stone artifacts are found scattered over 15 or 20 acres. Tools, the same in type and with the same degrees of wear and alteration as those from the sandy bed of the channel, occur, though in fewer numbers, on the clay-loam bank well above high watermark, and for some distance on the moraine to the east. There is only a very slight amount of debris of the projectile point cultures. This is concentrated along the swamp that occupies the deepest part of the channel.

There is another sand-bar site about 6 miles to the northwest where large, waterworn choppers and other implements were found in 1938. A few possible waterworn artifacts have been found to the southwest on the moraine in the vicinity of the remnant of the Lum channel. Practically no searching has been done in that area.

The waterworn assemblages include choppers, chopping-tools, probable hand-adzes, scrapers, beaked or pointed implements, gravers, coarse flakes with little or no trimming which could be used as knives, picks, cores, stones used as hammers or anvils, and implements of a kind I've never seen described. There is nothing like a projectile point or well-flaked blade. There are no hand-axes. Any resemblance to a hand-ax is probably accidental. The majority of the materials used were quartzites and argillaceous stones, and sometimes any suitable rock that was handy. The tools were made from pebbles, split pebbles, fragments, and coarse flakes. Even when mixed on the surface with heavy debris of later peoples, they can be separated almost certainly by type, and certainly by the waterwear and polish which occur in varying degree on most specimens.

Some choppers were made by knocking the rounded corner off a boulder. The thick flake was used as it was, or sometimes the butt end was modified, or the bit trimmed a little. Others were made by trimming the side or end of a split or naturally flat pebble. Some have a very narrow working edge compared to the size and weight. Lengths range to 20 cm., and weights to 5 pounds or more. Many of the choppers, as well as the scrapers or hand-adzes, were made with the working edge at an acute angle to the longest axis. One, a chopper or massive scraper, was made from an outer flake, 20 cm. long, 12 cm. wide, and 8 cm. thick at the bulbar end. A thick flake was struck off at one side of the bit end, another higher up on the opposite side, and the space between trimmed with narrower, thinner flakes leaving a slanting convex edge.

Some of the implements are similar in appearance to the chopping tools from the lower Palaeolithic cultures of southern and eastern Asia (Movius 1949). These have large flakes more or less alternately removed from each face. One, roughly circular with diameter of 9 cm. and thickness of 6 cm., has 4 flake scars on one face, 3 on the other. Part of the original rolled surface of the pebble remains on one side.

There are many sizes and shapes of scrapers. Among them are concave, end, end-and-side, double-ended, scalloped-edge, and nosed forms. A few are like the "horse-hoof cores" of Australia (Mitchell 1949). The nosed scrapers have convex, straight, slightly concave, or almost pointed working edges.

Among the beaked implements are single- and multiple-beaked forms, high-keeled single beaks, double-ended, and inverse double-ended beaks. There are various combinations of scraping edges with beaks or points. Some double-ended implements have a scraper at one end, a beak at the other. One specimen, a keeled inverse double-ended scraper 9 cm. in length, has a beak at one corner. Sizes of beaked implements range from 3 cm. or less to one 18 cm. in length. The largest specimen is in combination with another kind of implement.

Gravers have narrow, chisel edges, diagonal or straight across the side of a flat pebble or fragment. They were usually made by striking off a deep chip from one face and another next to it from the opposite face. Some have the side opposite the transverse chisel edge, where the index finger would press, trimmed away at a right angle. Some implements similar to these but larger, have a wide, transverse, knife-like edge. There are individual similarities among these to naturally shaped stones, but large series of each are distinctive. Naturally shaped stones for comparisons were gathered from crushed stone, on gravel roads, and at random on the moraines.

Some choppers and scrapers were made similarly. The bit end was trimmed at one side from one face, the opposite side from the opposite face, and the edge between trimmed from one face only, leaving a more or less diagonal working edge.

Picks are of several kinds: end, double-ended, and side. Some are made on long, thick splinters of artificially fractured rocks with secondary working at the butt end. Some on naturally pointed pebbles, the point being further trimmed. Others have blunt, shouldered points. One specimen is in combination with a chopper.

One variety of implement has a double notch made by removing small, deep chips from 1 to 2 cm. apart from the outer face on each side of a ridge, near one end of the lower edge of a thick flake. Two specimens have scraper edges worked inversely at the end farthest from the notches. Only 7 of these notched flake implements have been found, all in a single area in the

channel. All are waterworn or polished. These are among the certain artifacts. No naturally shaped stones resembling them have yet been found.

Many specimens were probably worn by both water and glacial ice. Some have a rolled look, with the ridges between flake scars worn away; others have a glossy polish without much erosion of the flake scars. Some have the wear or polish over all the surface, others on only a portion. The smoothing feathers out along the same contour line, the remaining portion being rougher in texture. Some implements show only a trace of wear. A portion show ice-planing on probably artificial surfaces. Many others were made from soled, glacial pebbles with some of the original planed surface remaining, but here I am referring to only those on which part of the flake scars or probably artificially fractured surfaces are planed away. The planing on some is flat, with sharp parallel striae. Others appear to have been dragged along a surface less abrasive than sandstone. The planing tends to follow the contours of the flake scars, and the striae are less distinct. The portion above the planed surface is often polished.

Implements made of argillaceous stone are always altered in color on all surfaces, those of quartzite usually not. But the alteration of artificial surfaces of other stones, and possibly some quartzites, is as great as can be found on the natural surfaces of any similar kinds of stone of this region. From their appearance it is likely that some if not most were derived from interglacial formations.

Some of the observations made by Movius concerning the Paleolithic of southeast Asia also apply more or less to this Michigan material: a conscious attempt was made to produce implements with the least amount of work; advantage was taken of the accidental shape of the flakes and fragments, rather than a definite technique followed in shaping the stone; most of the crudely fractured pieces of stone would be hard to recognize as showing traces of artificial work if found isolated.

Of the thousands of projectile points and associated artifacts and debris of presumably later date found in the Imlay channel, none has shown any trace of waterwear. The earliest are probably those of the dartpoint cultures. Among the shapes are Plainview, Eden Yuma and variants, and some Sandia-like which probably belong with the Yuma. Most are of argillite, some of quartzite, and a small proportion of flint. Arrowheads and other chipped artifacts of much later cultures are nearly all of flint or chert, practically never of argillite.

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February, 1954

A COMMENT ON THE WINDSOR SITE, JAMAICA

In Marian DeWolf's recent interesting article on Jamaica archaeology she refers to an earthwork and trench as Windsor Fort, built by the British in 1803 (DeWolf 1953: 236), citing Cundall (1915) as her authority. Actually Cundall mentions the fort but makes no attempt to suggest that its site was on Windsor Hill, which trench has always been known as Spanish Fort. From my local research, Fort Windsor was built on the sea shore, 1000 yards north of the hill, where up to a few years ago stone foundations still existed.

The Windsor Hill site presents one of the most curious mysteries of the north coast, and in 1951 I excavated the hole with a view to a solution and moved and sifted about three tons of earth which had been thrown in during the early part of the 19th century.

At some uncertain period on this natural, strong, defensive position, an entrenchment was dug 8 feet deep, 70 feet long, and 30 feet wide, and in its rear, a bottle-shaped excavation 17 feet deep with a base diameter of 20 feet. Two North Americans, one in 1930 and another in 1949, made attempts to search the debris in the hole, possibly with a view to finding treasure, but no records were made and the possibility of studying the stratification was lost. Indian, Spanish, and English relics were found and taken away.

My excavation brought to light hundreds of Arawak potsherds, 8 chalcedony beads, shell beads, and Spanish sherds and tiles dating from the same period as the near-by Spanish settlement at Seville (1510-1534). The sherds have been examined and classified by John M. Goggin and include an early variety of Columbia Plain majolica sherds, typical of the early 16th century. Also found were a large quantity of pieces of late 18th- and early 19th-century English chinaware and castaway slave agricultural implements. A lead bullet, a piece of a sword, a musket flint, and a powder funnel were the only relics of a military nature.

The evidence proves that Arawak Indians occupied the hill for a long period, the Spaniards for a short time, and that the English, who had a plantation house about 200 yards away, used the hole as a refuse dump in the early 19th century.

Further excavation of the entrenchment is needed to date it. In 1937, on the site of Seville a mile to the west of Windsor, a brick-lined well of similar design and proportions to the hole at Windsor was discovered near the foundations of the Castle which had been torn down by the early English settlers, and in this well were found Spanish sherds similar to those found by me at Windsor, suggesting that this hill was occupied by the

Spaniards at the same time as their occupation of Seville. It is, therefore, a possibility that the Spaniards dug the cistern but never completed it, in the same way that they commenced a stone church at Seville and left it unfinished. Another possibility is that the hole was dug by Don Christopher Ysassi, the last Spanish governor of Jamaica, who was frequently in this area from 1657 to 1660, where he received from time to time supplies from Cuba to support his warfare with the English on the south side of the island. He mentions having dug a cellar in a dry place to hide 34 barrels of gunpowder. Unfortunately for him the powder was removed by one Captain Reyes to a less hidden place and was captured after a skirmish by the English troops.

DeWolf's suggestion that the excavation might have been dug by Indians under white (Spanish) supervision is quite plausible, as we know that the natives worked for the Spaniards at Seville, and she is correct when she states that such projects are not encountered in Arawak culture.

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March, 1954

CRUCIFORM ARTIFACTS OF THE SIERRA OCCIDENTAL

Investigators in the western and northwestern areas of Mexico as well as in southern Arizona have for a long time been familiar with a rather curious type of artifact, the possible purpose of which has thus far defied even logical speculation. Moreover, in spite of the fact that these artifacts are of relatively wide distribution and are numerous enough to escape the designation "rare," there is only the most meager reference to them in the literature. This artifact is a cross, usually quite well made, of obsidian, chalcedony, serpentine, or other stone and there is even one reported of moonstone (Kelly 1945, Fig. 47 *a*). One of similar form but made of coarse lava was found at Topolobampo, Sinaloa (Ekholm 1942). The size of the crosses varies from quite small ones to larger ones measuring as much as 5 inches diagonally tip to tip.

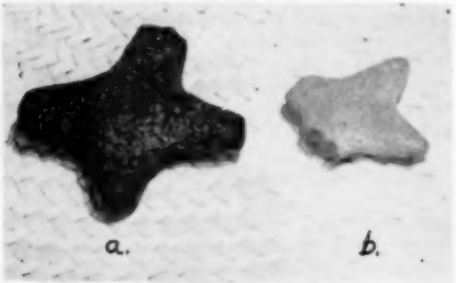

Fig. 60.

The crosses pictured (Fig. 60) are from Durango where perhaps the greatest concentration of the form has occurred. Cross *a* is of unpolished obsidian, 48 mm. diagonally tip to tip. This is from the Hacienda Santa Barbara on the ranch of Fred Weicker, some 56 km. west of Durango City and some 10 km. west of the Weicker Site which has been under investigation by J. Charles Kelley of Southern Illinois University. The stone cross *b*, 38 mm. diagonally tip to extrapolated tip, was a surface find at the Schroeder Site about 10 km. south of Durango City, a site also investigated by Kelley. Other crosses are reported to have come from this site but are unavailable. Some 60 km. north of Durango City on the Hacienda El Ojo (Mac Howard II) a small cross of highly polished obsidian was found in association with rather unusual projectile points.

While the archaeology of the various sites is as yet not too well worked out, in general it appears that the appearance of the crosses is not thus far related to any specific archaeological pattern. The Hacienda Santa Barbara site (Weicker: Mac Howard I) yields pottery of a very crude sort, coarse and undecorated. Both the Schroeder site and the Hacienda El Ojo (Mac Howard II) show definite Chalchihuites influence and yield well-made painted pottery.

A most interesting aspect of the distribution of this artifact form is the fact that finds are reported from both highland and coastal regions of Mexico as well as from southeastern Arizona. Heretofore the Sinaloa region has shown no affinities with the Highland cultures (Kelly 1938) except for the Guasave area (Ekholm 1942), and thus the moonstone cross mentioned earlier forms a tenuous but suggestive link. Charles C. Di Peso of the Amerind Foundation in correspondence with the director of the Instituto Interamericano mentioned a rumor that two of the stones had been found in a burial near Tiburon Island, Sonora, and he also mentioned several finds in Arizona and one near Cananea, Sonora. Other finds such as that at Guasave, Sinaloa (Ekholm 1942) tend to strengthen the Highland-Coastal relationship, especially if we consider the occurrence of the form at Cuicuilco in the Valley of Mexico (Haury 1945).

So far as can be determined there is no way of fixing the age of the cruciform artifacts since they have not been found in relatable strata. One cross was found at the Weicker Site which also yielded a fluted projectile point (Lorenzo 1953) found by Charles Kelley's group, and which falls within the Clovis fluted category. However, the finds were not in recognizable strata. The

Cuicuilco cross mentioned above is not definitely datable. The Durango crosses were found in complexes certainly rather late (Schroeder site; Hacienda El Ojo) which show strong Chalchihuites relationships, and one Durango cross, at least (Hacienda Santa Barbara site), was associated with materials which could conceivably be early. Again to quote private correspondence, Di Peso mentions that Emil Haury found one of the crosses in the San Simeon Cienaga of southeastern Arizona in association with material reported to be San Pedro Stage. Thus, dating must await further study and field data. (Thanks are herewith given to J. Charles Kelley of Southern Illinois University and to Charles C. Di Peso of the Amerind Foundation for information given in correspondence to Carl B. Compton, Instituto Interamericano, regarding the cruciform artifacts).

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ANCESTOR OF POTTERY?

The state of Durango, Mexico, is situated almost in the middle of the Sierra Madre Occidental. Nearly the entire state is rocky and mountainous and there are fairly large areas which are almost inaccessible though there are numerous fertile valleys which serve to produce the grain and herbage for the cattle which are important in the economy of the state. In the mountains and in the valleys may be found abundant evidence of the activities of man over what was likely a rather long period of time; there is evidence of what appear to be several rather diverse cultures though relatively little archaeological study has been made of these cultures thus far.

In the mountains in the vicinity of Mezquital some 50 miles to the south of the city of Durango are numerous caves and rockshelters. It was in one of these caves that the writer discovered a bowl (Fig. 61) which conceivably may have been an "ancestor" of true pottery. This bowl is 15 inches across, has a 4½-inch rim around a cup-shaped center 3 inches in depth. As the rim slants upward from the center, the bowl actually is 6 inches in height.

The distinctive feature of the bowl is that it is formed of grass which has been thoroughly covered with clay and then wound in the manner of coil-built pottery. After the bowl was formed it was obviously plastered with clay both inside and out and the clay smoothed and worked to form a fairly well-shaped bowl. As would be expected the walls are quite thick, being in places more than an inch and almost nowhere less than ¾

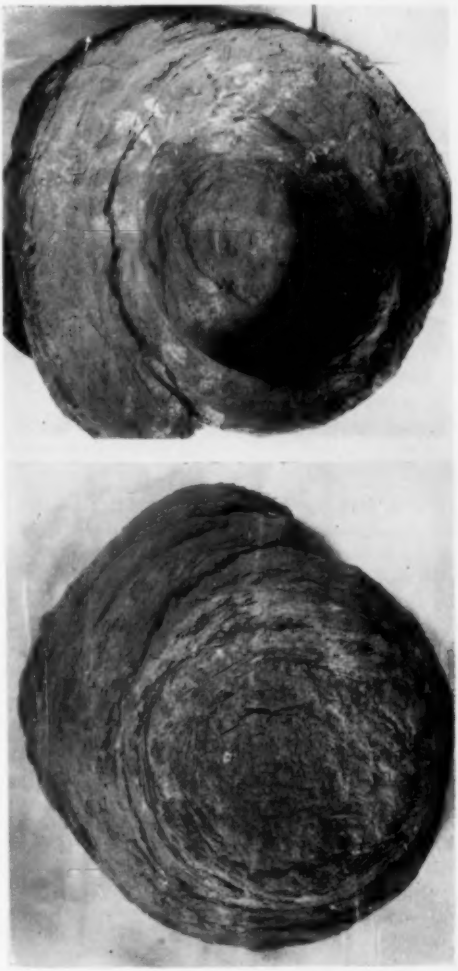

FIG. 61. Bowl of clay and grass from a cave near Mezquital, Durango, Mexico.

of an inch thick. As this mixture of straw or grass and clay is the most common building material in Mexico — adobe — we might call these "adobe bowls."

The clay in the bowl is quite sandy and microscopic examination reveals almost no inclusions of organic material other than the grass which was deliberately mixed with it. Likely the clay would have fired well. In color it is gray verging on tan and it is not incompatible with materials available near the point of discovery. While it is possible to fire clay containing an astonishing amount of organic material without causing disintegration of the ceramic piece it is unlikely that the amount of grass in the bowl in point would have permitted firing. Such bowls would, of course, become true pottery if burned either through accident or intent. They may even have been ancestral to pottery in this area. However, in addition to firing, the percentage of clay and grass would have had to be quite different to produce true pottery. Perhaps this actually happened, for if grass were scarce and clay plentiful, a great deal of clay might have come to be used with only enough grass to hold the vessel together while drying took place. Another possibility is that the method of coiling eventually suggested the use of pure clay with little or no grass.

The use of the clay-grass bowl is problematical; it is quite fragile in spite of its thickness and weight, about six pounds. It could not have been transported except with extreme care nor would its capacity have made it a very efficient storage vessel. Actual preservation of the bowl would depend upon its being continually in a dry place; it could have been used to hold only dry material.

The cave which yielded the bowl showed considerable evidence of human occupation. Though no more than surface reconnaissance has so far been attempted, a number of artifacts were collected including a fire stick, clay beads, crude potsherds, and a headless ceramic figurine. Several tiny ears of corn were found. In subsequent examination of other localities near by similar materials were encountered, as well as stone artifacts and infant burials in urns. The results of preliminary examination would seem to indicate that various occupations of these caves had occurred over a rather long period.

The writer wishes to thank Alex D. Krieger for his advice and assistance not only in the matter of the clay-grass bowls but also regarding the writers' activities in Durango over a considerable period. His aid has been invaluable.

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"DISHARMONY BETWEEN ASIATIC FLOWER-BIRDS AND AMERICAN BIRD-FLOWERS"

L. van der Pijl published an article with the above title in the *Annales du Jardin Botanique de Buitenzorg* (Vol. 68, Part 1, 1937, pp. 17-26, 6 plates). He has written to me to call my attention to it because of the striking way in which it corroborates O. F. Cook's idea that some useful American plants, among them the Hibiscus, were carried to Asia in pre-Columbian times. I have recently reviewed some of Cook's ideas (Carter 1950, 1953) on this subject and found them to have more merit than it has been customary to allow them. It is curious that Pijl seems not to have known of Cook's work, nor did I know of Pijl's. Yet these pieces of work are distintcly complementary and, of course, must be considered in relation to recent work by Ekholm, Heine-Geldern, Heyerdahl, Sauer, Burkhill, and others.

Pijl shows that the anatomy of bird-pollinated flowers in South America and Southeast Asia differs. The difference is due to the presence of hovering (humming) birds in America versus the climbing, acrobatic, nectar-seeking birds of Southeast Asia. As a consequence of these differences some American plants dependent on the American humming birds for fertilization are virtually sterile in Southeast Asia.

He commented: "Some Old World *Hibiscus* species . . . represent enigmatic exception." (p. 18) From close observation of birds feeding on *Hibiscus rosa sinensis* L. and *H. schizopetalus* Hook F. he concluded that they were getting at the nectar by cutting holes in the calyx and thus short-circuiting the reproduction mechanism. He concluded: "I dare not say that the above results point to an American origin of *H. rosa sinensis*, but it is certain that both *Hibiscus species* (cf. *H. schizopetalus* and *Fuchsia*) would fit very well to humming birds that can touch the sexual organs when hovering before or under the flowers" (p. 26). In June, 1953, he wrote me from Java that he considered that he had demonstrated that *Hibiscus* does not live in harmony with the pollinating birds there and that it must be considered to have been imported in pre-Columbian days.

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December, 1953

IRRIGATION AT TEOTIHUACÁN

The role played by irrigation in the development of civilization in Mesoamerica has never been satisfactorily determined. Steward (1949: 12-13, 17) has assumed that it played a role in Mesoamerica similar to that which it played in the development of the earliest civilizations in Mesopotamia, Egypt, the Indus Valley, north China, and coastal Peru. In each of these other areas the first urban civilizations to develop were in regions requiring the control of water for the cultivation of crops, and the necessity for this control is generally accepted as having provided the basis for the development of these urban class societies. Yet in Mesoamerica the matter has actually never been established one way or the other. Armillas (1948: 109) states that rainfall is sufficient today during the rainy season in the highlands of central Mexico in general, and the Valley of Mexico in particular, to produce a crop of maize without irrigation, but that irrigation is necessary for the production of an additional crop in any year. Kidder (1946: 5) expresses the same view with regard to the highland basin in Guatemala in which Kaminaljuyú is situated. Yet Gamio (1922) states that irrigation *was* necessary for cultivation in the sub-valley of Teotihuacán in the Valley of Mexico in 1917.

This is the contradictory situation which we propose to examine here. Confining ourselves to the Valley of Mexico, it is clear that the first great civilization to develop there was that of Teotihuacán. And in its general outlines the civilization of Teotihuacán did resemble the first civilizations to develop in the five other regions mentioned above. Yet it has never been established that irrigation formed the basis of production in ancient Teotihuacán.

A trip to Mexico in 1950 made it possible for J. H. Brand and myself to conduct a brief field investigation on this subject. Until now it has not been possible for either of us to relate our limited discoveries to existing findings and so present any semblance of a meaningful report. I have now had the opportunity to do so and this abbreviated report is the product of it.

The results of our brief investigation are as follows:

(1) Irrigation is necessary today in the sub-valley of Teotihuacán for the production of maize during the rainy season.

(2) The present irrigation system does not provide sufficient water for the cultivation of all the land to which water could be brought.

(3) Farmers in the lower valley in and around the town of Acolmán complain that those in the upper valley monopolize most of the water for their own lands and that the lower valley suffers severely as a result. This was denied by municipal officials in the upper valley town of San Juan Teotihuacán.

(4) For the four years preceding 1950 it had not been possible to produce a successful crop of *maiz temporal* in the lower valley because of lack of sufficient rainfall. *Maiz temporal* is maize grown in land entirely dependent on rainfall for moisture, that is to say, land which not only receives no water from any irrigation system but also is relatively devoid of subsurface moisture at the 4 to 6 inch level. Land containing subsurface moisture does exist in the valley and is capable of producing a crop with the help of the rain which does fall. This subsurface moisture apparently is the result of seepage from the river and canals and from underground sources which have been tapped in various parts of the lower valley by a number of wells.

(5) The present supply of water for irrigation, aside from the previously mentioned wells, comes from the quite small Río San Juan Teotihuacán which runs through the ancient city and from a number of underground springs which come to the surface both within the grounds of the church at San Juan Teotihuacán and near by. These streams are channeled near the church into a single canal which is approximately 3 m. wide and 2 m. deep. The river, which has been similarly channeled some distance downstream from the ancient city seems, if anything, to be somewhat smaller than the canal. The rate of flow of water in the canal is moderate, being neither sluggish nor turbulent, but our attempts to measure it more precisely than this were unsuccessful in the time available. Similarly unsuccessful were our attempts to determine the present acreage under irrigation, principally because the matter was a political issue between Acolmán in the lower valley and San Juan Teotihuacán in the upper. Our principal informant in the lower valley was Sr. Pastor Lozano, dairyman and alfalfa grower in Acolmán, and the town's Municipal Secretary. No aerial maps of the valley have ever been made so far as we were able to determine and so we were unable to obtain a clear conception of the valley's irrigation system as a whole.

Thus the evidence we collected indicates that irrigation *is* necessary for cultivation in the sub-valley of Teotihuacán today. This however does not necessarily

mean that it was necessary when the civilization of Teotihuacán came into being.

In fact the information we collected raises two specific problems: (1) was irrigation as necessary in the sub-valley 2000 years ago as it is today? (2) was the sub-valley large enough in and of itself to make possible the development of a class society based on production by means of irrigation? No conclusive answer to either of these problems is possible at this time. However, the work of the Virú Valley investigators provides suggestive comparative data bearing on the resolution of the second problem.

Gamio (1922: xv) in his monumental study of Teotihuacán — a study which was in many respects a forerunner of the Virú Valley Project in terms of what it sought to accomplish — states that a total of 10,500 hectares were under cultivation in the valley in 1917, 9,500 of these being under cultivation by means of irrigation. The importance of irrigation indicated by these figures was substantiated by the information which we obtained in our brief investigation 33 years later, although as indicated we were unable to obtain any figures on acreage under cultivation. 9,500 hectares is approximately 23,500 acres. In the Virú Valley of Peru, an area in which irrigation production almost certainly led to the development of class society and the state independent of major outside influences (Millon 1952), Willey estimates that when the valley's population reached its maximum in Late Gallinazo times 9,800 hectares, or 24,200 acres, had been brought under cultivation in a single, integrated irrigation system (Willey 1953: 394). This suggests that the area under cultivation by irrigation in the valley of Teotihuacán in 1917 would most probably have been sufficiently large, *theoretically* at least, to lead to the development of class society in aboriginal times, provided of course, that irrigation was as necessary when the Teotihuacán civilization was beginning to develop as it was in 1917.

That, however, brings us to the other problem. Gamio points out (1922: xvii) that hydrographic conditions in the valley have been altered by the recent draining of near-by Lake Texcoco and by the region's earlier deforestation. Both of these changes have acted to lessen the amount of rain which fell on the sub-valley while not appreciably affecting the central and southern parts of the Valley of Mexico where Lake Xochimilco, parts of Lake Texcoco, and other bodies of water still exist and where some forest cover still remains. Irrigation is not needed for cultivation in the central and southern parts of the Valley during the rainy season today. The station in the Tacubaya district of the city of Mexico reports an average annual rainfall of 767 mm. (30.2 inches) while the San Juan Teotihuacán station reports 590 mm. (23.2 inches) (Vivó 1946: 16, 35). This difference in rainfall is sufficient to make irrigation necessary in the sub-valley of Teotihuacán. It also explains why Armillas was able to state, as previously mentioned, that irrigation is not necessary for cultivation in the Valley of Mexico or in Mesoamerica in general. Armillas is right, in general, but the relatively small area represented by the sub-valley of Teotihuacán is an exception to his generalization. Whether it represents an important exception remains to be established. Nevertheless, it is appropriate to emphasize at this point what has been pointed out by many others including Armillas, namely, that Mesoamerica is a region of extraordinary climatic diversity, and that closely neighboring regions, even where altitude differences are not great, often possess sharply different climates. This explains how it is possible for the contradictory statements of Armillas and Gamio cited at the beginning of this paper both to be true.

Still another reason why the Gamio statement (that irrigation was necessary in 1917) has received little attention is that Gamio himself does not seem to have believed that irrigation was necessary for cultivation in the sub-valley in preconquest times because of the altered hydrographic conditions alluded to above.

Now if the changes indicated by Gamio are responsible for all of the present difference in rainfall between Teotihuacán and the rest of the Valley of Mexico, then there would be no reason to assume that irrigation would have been necessary when the Teotihuacán civilization was coming into being. Actually, however, Gamio admits that the relative height of the hills around the sub-valley hinder the passage of humid winds and so act to make the Teotihuacán area drier than the rest of the Valley of Mexico under any conditions (Gamio 1922: xvii). But of even greater relevance is the fact that what evidence we do have concerning climatic conditions in the Valley of Mexico several thousand years ago indicates that the rainfall during that period rather than being higher as Gamio suggests was actually lower, and in the *entire* valley. The first evidence of this comes from the site of El Tepelcate, near Chimalhuacan on the present eastern shore of Lake Texcoco, which Apenes (1943: 30-2) described as an ancient, artificially built-up habitation site on the shore of the lake which may also have served as an early *chinampa*. (The possibility of the existence of intensive cultivation in *chinampas* at this early level raises interesting questions in its own right but they are beyond the scope of this inquiry.) Noguera (1943: 33) determined the El Tepelcate site to be late Ticoman-Teotihuacán I in age on the basis of its ceramics. The site was deep under water during Aztec times and is still partly flooded during the rainy season. Apenes reported (1943: 32), even though the lake has now been subjected to considerable artificial drainage. Paul Sears (1951) recently lent strong confirmation to these observations of Apenes on the basis of pollen analysis. Sears reports that pollen profiles in the Valley of Mexico reveal the existence of a prolonged dry period extending throughout the late Archaic and persisting

well into Teotihuacán times. In discussing the El Tepelcate site in connection with his discoveries, Sears states (1951: 57):

> . . . When the site was occupied during the late Archaic, the water level — as evidenced by stone-work — was at least as low as the present dry-season level, which is due to systematic and prolonged drainage. Unless evidence of major changes in the natural drainage pattern can be produced, we may assume that the low level in late Archaic times was due simply to a lessened rainfall and high evaporation, as the pollen suggests. Pollen analyses and stratigraphy show that the transition from Archaic to Teotihuacan occurred during a prolonged period of low oak and high pine — a dry period. Since this dry period continued in force for a considerable time thereafter, its relation to the subsequent Teotihuacan phase seems clear. . . .

Thus, unless Apenes and Sears can be shown to be wrong, there is a strong presumption on the basis of the known borderline nature of rain agriculture in the Valley of Mexico today that irrigation would have been necessary for cultivation in the entire Valley of Mexico in late Archaic times. And since the sub-valley of Teotihuacán appears to receive less rain than the rest of the valley under any conditions, it would follow that cultivation in that sub-valley would have been impossible without irrigation.

It was noted earlier that the acreage under cultivation by means of irrigation in 1917 was theoretically sufficient to have led to the development of a class society in the past on the basis of the need for coordinated, integrated control of the irrigation system. But we could do no more than state the matter in this tentative fashion. If, however, the observations of Apenes and Sears can be conclusively confirmed, that is, if it can be shown that they could have been due to no other causes, then irrigation would have been indispensable to large-scale production in the *entire* valley during the critical period at issue and there would no longer be any theoretical question as to whether a sufficiently large area were involved.

This paper has concerned itself with Teotihuacán and the Valley of Mexico. Nevertheless, it should be pointed out that the Valley of Mexico is by no means the only area in the highlands of Mesoamerica in which irrigation is required for cultivation. For example, it is required at Acatlán in southwestern Puebla which Armillas (personal communication) believes may have been the source for the famous thin orange ware of Teotihuacán III times. Still another such area is the upper Papaloapan drainage of southern Puebla and northern Oaxaca. Armillas (1949: 88) notes that irrigation was reported by the Spanish at Teotitlán, Cuicatlán, and San Juan Atlatlauca in this drainage shortly after the conquest. These are areas which today are virtually unknown, archaeologically. One reason for this is that the upper Papaloapan drainage travels through deep gorges which open periodically into flat but isolated basins. Brand and I were able to examine, thanks to the cooperation of Alfonso Villa Rojas, aerial photographs of two of these basins, Cuicatlán and Teotitlán. These photographs revealed that both valleys were served by a network of coordinated canals, indicating that irrigation is still the basis of production today. At Tehuacán farther to the north the rainfall is well below that of Teotihuacán (Vivó 1946: 49) and presumably irrigation is necessary for cultivation there also, for it is in the same drainage. I mention Tehuacán because of a discovery made there a number of years ago by Noguera which has since never been developed further, so far as I know. What he found there in the lower levels of his excavations was Monte Alban I pottery, fine gray ware, in association with late Archaic Valley of Mexico figurines (Vaillant's Type E of Ticoman). This suggested to Noguera that he had found evidence of Zapotec culture which antedated that found at Monte Alban itself. Noguera felt that its ultimate source was probably Cholula, but this has never been substantiated so far as I know (Noguera 1940: 317-9). Noguera's discovery raises at least the possibility that irrigation may have played a definite role in the early development of the civilization of Monte Alban, either at Tehuacán itself, or in the intervening basins which would have had to have been traversed to reach the area around Monte Alban. Certainly any possibility that such might be the case would be sufficient cause, at the very least, for a surface survey of the area around Teotitlán, Cuicatlán, and Atlatlauca.

Thus, not only does it seem highly probable that irrigation production formed the economic basis of the civilization of Teotihuacán, but there seems to be a definite possibility that it played an equally important role in other, admittedly relatively small, parts of the highlands of Mesoamerica as well. In view of this, it would seem that the problem of irrigation in Mesoamerican development should be subjected to concerted, concentrated attention in an effort to determine unequivocally whether or not irrigation played the same basic role in the early development of Mesoamerican civilization that it played in ancient Peru, China, Pakistan, Egypt, and Iraq.

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December, 1953

NOTICE

In the Winter, 1954, issue *Archaeology* will publish "Archaeology as a Career" by John H. Rowe, Associate Professor of Anthropology, University of California. This article describes in detail the education and preparatory work desirable for a young man or woman considering an archaeological career. Rowe also describes the various kinds of posts available and the rewards, financial and otherwise, which may be expected. The article will be illustrated and include a brief bibliography.

Believing that such an article will be of wide interest, reprints will be made available both singly and in bulk. It would be of great assistance if those institutions and individuals who wish to order 50 copies or more would place orders in advance of publication. After publication it may not be possible to fill large orders. These orders should be addressed to The Editor, *Archaeology*, 211 Jesse Hall, University of Missouri, Columbia, Missouri. The reprints will be sold at cost, $3 for 50 copies, $5 for 100 copies, postage extra. Requests for fewer than 50 copies should be sent, *after January 1, 1955*, to the Business Manager, *Archaeology*, Andover Hall, Cambridge 38, Massachusetts.

BOOK REVIEWS

EDITED BY WILLIAM A. RITCHIE

Memorial de Tecpan-Atitlan (Solola). Anales de los Cakchiqueles Historia del antiguo Reino del Cakchiquel dicho de Guatemala. Edited by ERNST MENGIN, Corpus Codicum Americanorum Medii Aevi, Vol. IV. Einar Munksgaard, Copenhagen, 1952. 46 pages, 96 facsimile plates, $76.00.

Mesoamerican archaeology leads one from really ancient times right up to the Spanish conquest and beyond, so that postconquest writings of the 16th century are part and parcel of the corpus of evidence which can be used by archaeologists in this field. Cakchiquel is one of the Mayan languages, and the Cakchiquel text, here reproduced for the first time in facsimile, has long been famous through various partial translations, and has been put to good use by Mayanists. Brinton, calling it the "Annals of the Cakchiquel," considered it one of the most important documents in aboriginal American literature, "both for its historical and linguistic merits."

As such, it is important that a facsimile reproduction should be widely distributed so that varying translations can be compared and perhaps improved by the few scholars competent to do so. There is now the further consideration that some examples of the reproduction should surely survive the modern threat of mass destruction of archives, as well as of people. The original is now in the vault of the library of the University of Pennsylvania Museum, but who can say that it will not be destroyed, vault and all? Archaeologists in general will continue to rely on translations, but should applaud the publication of the original text, nevertheless. It seems a pity that the price had to be so high, but one hopes that many librarians will order, stretching their budgets if necessary. The volume is the fourth in a series of similar publications for which future generations will be thankful.

As a manufactured product it is superb. Photostats are reproduced in collotype at full scale so that the bound volume measures about 12 by 16 inches. The 96 plates are preceded by a 9-page introduction and selected bibliography in English, which is then repeated in French, German, and Spanish. This commentary is excellent and will be useful to anyone interested, whether he proposes to read the Cakchiquel text or not. It is, one supposes, based in the main on translations and observations of others, rather than on a fresh attack on the original.

Two or three items of interest will be mentioned. Mengin disagrees with the opinion of Brinton, who thought that the document was part of a "titulo," composed for use in a lawsuit. He notes that the first 17 pages (among the 48 pages not translated by Brinton) have now been translated into Spanish (Teletor 1946). These, it seems, form a journal of an inferior court, "which can only be regarded as a supplement to the main document."

The main document starts on page 18, numbering in the present bound order of the originally loose sheets. It breaks off at page 96, some unknown number of additional pages having been lost. If there was a title page, that also was lost before the binding. In his text Mengin calls it the "local chronicle of the city kingdom of the Cakchiquels," and adds a similar phrase to the formal title, which thus becomes rather unwieldy. He agrees in substance with Brinton's opinion, based on internal evidence, that the main document was begun before about 1560 by the father of Francisco Ernantez Xahila, continued by the son from about 1560 to 1583, "when it was taken up by Francisco Diaz, and later by other members of the Xahila family" (reviewer's quotes of Brinton).

It may be helpful to note several titles which, sometimes in combination as in this case, have been used for the same thing: *Memorial de Tecpan-Atitlan* (with or without the town name *Solola*), *Memorial de Solola, Anales de Los Cakchiqueles, Annals of the Cakchiquel, Anales de los Xahil.* Cross-referencing by librarians seems indicated.

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The Annals of the Cakchiquels. Translated from the Cakchiquel Maya by ADRIÁN RECINOS and DELIA GOETZ. *Title of the Lords of Totonicapán.* Translated from the Quiché text into Spanish by DIONISIO JOSÉ CHONAY. English version by DELIA GOETZ. University of Oklahoma Press, Norman, 1953. 224 pages, decorations, $3.75.

Although nowhere stated, this is clearly a translation of the Spanish volume published by Recinos in Mexico in 1950. The most important of the two documents is the *Annals of the Cakchiquels.* This native chronicle has been known for a long time but never been translated in its entirety. Brinton, with the help of an unpublished French translation by Brasseur, translated and published the most important part, that dealing with the pre-Spanish history of the Cakchiquels and with the Spanish conquest. In his Spanish edition Recinos for the first time published a trustworthy translation of most of what Brinton and others had left untranslated, all of it material on the early colonial period. (The reader is referred to my review of the Spanish edition in the *Boletin Bibliográfico de Antropologia Americana,* Vol. 13, Pt. 2, pp. 133-5, where I discuss in more detail what are the parts newly translated by Recinos and what still remains untranslated.) It is unfortunate that in this English translation a very large part of the new material has been omitted. In

the note 290, page 143, we are warned that from here on "the manuscript speaks of affairs of less importance to the reader" and, therefore, only some items have been extracted. The next 16 pages are a condensation of 60 pages in the Spanish edition. It is true that most of the omitted parts would be of little interest to the student of pre-Spanish Cakchiquel history but they are very important for the life of Sololá in the 16th century and even contain materials which throw light on pre-Spanish social institutions. The Spanish edition is thus to be preferred to the present one. There is no doubt, however, that this edition is the best English version available. This reviewer considers Recinos' translation a still greater contribution than his new version of the "Popol Vuh," which was so well received by the critics. He has corrected several grave errors of former translators and has added many useful notes. It is regrettable that the poor transcription of the de la Parra characters obliterates the distinction between glottal and nonglottal *tz* and *ch*, thoroughly maintained in the manuscript, and that the numbering of paragraphs used in all the other editions has been suppressed. It should also be pointed out that the page reproduced facing p. 118 is not the first one of the manuscript as the caption says but the 49th, the translation of which is on p. 108.

This is not the place to evaluate the content of a document like the *Annals of the Cakchiquels*, which has been known for such a long time. Little serious study of this document has so far been done, and it is to be hoped that the present edition will stimulate interest in its study. The conscientious scholar is advised to use the manuscript now made available in facsimile by Ernst Mengin (see preceding review) and the Spanish translation published by Recinos in Mexico in 1950. The present English version, of course, can equally be used for those parts retranslated from the Spanish.

The second document included in this volume is the *Title of the Lords of Totonicapan*, a Quiché history of very great value in complementing the historical part of the "Popol Vuh." It has been known for a long time, but this is the first time it has appeared in English. It is not accompanied by as many helpful notes by Recinos as is the *Annals of the Cakchiquels*.

Both documents are preceded by an able introduction by Adrián Recinos which discusses the history of the manuscript and the problem of its authorship and its historical value, and which gives a brief description of the ancient Cakchiquels, especially their main settlements and their calendar. One feature of the Spanish edition missing in this volume is the bibliography by Recinos of all works written in Quiché, Cakchiquel, and Tzutuhil, which although not a perfect one, has considerable usefulness.

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The Jonathan Creek Village, Site 4, Marshall County, Kentucky. WM. S. WEBB. The University of Kentucky Reports on Anthropology, Vol. 8, No. 1. University of Kentucky Press, Lexington, 1952. 141 pages, 52 plates, 41 figures, $1.00.

On the logical premise that "the purpose of archeology is to make history live again," Webb, who is especially qualified by his personal observations of Indian life in Oklahoma shortly after the turn of the century and his subsequent extensive archaeological investigations in the homeland of many of these Indians, seeks in this report to identify a certain precontact stockaded village in Kentucky with prehistoric Chickasaw and the pre- or protohistoric Natchez.

The Jonathan Creek Village lies within the historic Jackson Purchase, on the west bank of Jonathan Creek near its mouth on the Tennessee River, 35 miles from the juncture of the latter with the Ohio River. By its location alone, this extensive site merits the careful excavation and extensive historical research recounted here. It is unfortunate that the lavish (by present standards) excavation plans which were initiated in October, 1940 with 6 Civilian Conservation Corps crews, each under a qualified archaeological supervisor, were only partially carried out when the project had to close in March, 1942, with the sudden demise of CCC. However, more of the site was explored than would ever again be possible with hand labor, and the impressive total of 22 burials, 89 house patterns, and portions of 8 stockades was recorded.

Results of the explorations showed that 3 general house patterns, rectangular trench, rectangular single post, and circular post, existed at the site in this order of precedence. The stockades indicated that the type with large rectangular bastions and one instance of a tower astride was earliest, followed by stockades with small bastions which were either semicircular or square with rounded corners.

In his "Objective Conclusions" the author states concisely that the site was first occupied by a people who built trench wall houses and surrounded them by stockades with large rectangular bastions, protected gateways, and towers. Later a second occupancy constructed rectangular houses with single posts and stockades with small bastions. Efforts to determine artifact stratigraphy and to group lithic and ceramic traits into the two assumed occupations were unsuccessful. No historic materials were found. Coincidence of traits with the Tolu and McLeod Bluff sites of Kentucky and the Hobbs Island sites of Alabama is noted.

Then, after a careful summary of historic data on Chickasaw, Natchez, and Creek stockaded village construction, the author offers his "Speculations," plainly labeled as such. The thesis: the first occupation was Chickasaw, living adjacent to and in contact with the Great Creek Confederacy to the south and east. The second occupation could be that of the Natchez, based on the coincidence of spacing and shape of the Jonathan

Creek semicircular bastions with Du Pratz's "half towers" outside the stockade wall of the historic Natchez villages in southern Mississippi. There is much in the Chickasaw hypothesis with which the reader can readily agree without serious reservations. Historical and archaeological data indicate plainly that population increase and pressures in late prehistoric times in the southern portion of North America (and in Middle America, coincidentally) caused certain defensive architecture to be developed. The stockaded villages of the first Jonathan Creek occupancy were logically erected by Muskhogean people, whether Chickasaw or Creek. The question as to whether or not a superseding Natchez group was responsible for the rounded bastion stockade and, inferentially, the single-post houses, will cause most readers to pause automatically and some will object — automatically. But the author only proposes that, "The close known association of the Natchez in historic times with the Chickasaw, after the Natchez defeat by the French, may well be an indication of their mutual friendship and close association *in prehistoric times*, i.e., perhaps even prior to De Soto's time and for many decades thereafter, *before either Nation had had opportunity to acquire materials of White civilization*." (The italics are the reviewer's.) It may be argued that the tenuousness of Natchez-Jonathan site trait coincidence — the circular bastion is the only one emphasized by Webb — is suspicious. But the most conspicuous negative evidence may well be the absence at Jonathan Creek of the readily identified Natchez ceramic traits — Fatherland and Natchez Incised, with characteristic incised scrolls, or any of the lineal forerunners of known Natchez design styles, such as Plaquemine or Coles Creek. Regarding this negative evidence, Webb has informed the reviewer that the only ceramic remains recovered came from inside the largest of the large bastion stockades. Time did not permit excavation of the small bastion stockade interiors, so that no one can yet be sure there is no Natchez pottery on this site.

As the site records stand, the only trait suggesting Natchez occupation remains the rounded bastions, and the comparison rests upon the "half towers" described by Du Pratz but not yet verified by archaeological evidence. We cannot even be sure of the single post-hole, rectangular houses, since as of this date the reviewer knows of no positively identified Natchez house described from excavations. Plaquemine houses at the Gordon site of southern Mississippi and the Medora site of southern Louisiana were both rectangular, single post and wall trench in design. Substantiated or not in the mind of the reader, the "Speculations" are bound to be thought-provoking, especially in the light of the historic fact that Natchez units were readily accepted among the Chickasaw Nation and the Creek Confederacy to the north and east of their homeland.

It should be added that with this volume it has apparently been necessary to reduce the page size of the series to inconveniently small proportions.

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Woodchuck Cave, A Basketmaker II Site in Tsegi Canyon, Arizona. H. CLAIBORNE LOCKETT and LYNDON L. HARGRAVE. Edited by HAROLD S. COLTON and ROBERT C. EULER. Museum of Northern Arizona Bulletin No. 26. Northern Arizona Society of Science and Art, Flagstaff, 1953. iii + 33 pages, 18 figures.

This report is a welcome addition to the data and information on Basketmaker II sites of the San Juan drainage. It seems especially important in view of the relative paucity of published data on pure sites of this period. The site described is a rather dramatic one in which a series of headless and otherwise disturbed dessicated burials were found in a cave located high in the cliffs of Water Lily Canyon (a branch of the Tsegi) in a position which could be reached only over a rather hazardous and difficult route.

Notwithstanding a delay of 19 years between excavation and publication, and its passage through the hands of no less than 4 authors and editors and 8 other specialists, the data appear in a remarkably concise and factual monograph, abbreviated in form, yet complete in most important particulars. In the first descriptive section each of the 15 slab-lined burial cists are delineated in considerable detail as to the position and general characteristics of the burials and the accompanying artifacts, such as woven-fur robes, large tray-shaped baskets, lignite bead necklaces, pigments, and other typical Basketmaker grave goods.

There then follows a tabulation of the dessicated bodies as to sex (about 7 adult females and 4 males), age (8 infants and children), and evidences of diseases such as arthritis and pyorrhea. The tabular form is easy to use and in view of the absence of crania seems satisfactory for archaeological use.

The next section consists of an annotated, detailed catalog of the artifacts and specimens recovered. With the exception of the woven-fur robes these are enumerated and analyzed or listed individually. Among the artifacts included here are: 17 baskets, or fragments thereof, predominantly of two-rod and bundle triangular construction, with narrow yucca leaf, noninterlocking stitches; a square-toed sandal; conical stone pipes; wooden combs; stone pendants; notched dart points; and bone dice. Unfortunately, the diagnostic attributes which distinguish these artifacts from those of other periods and cultures are in some instances not given in the text and are frequently obscure or lacking in the illustrations. In spite of these gaps in the data most of the artifacts are described in sufficient detail so that the report seems certainly as useful as the earlier Basketmaker reports for general comparative pur-

poses. Furthermore, the presence of catalog numbers in figure captions and text for cross-reference, and the presence of more quantitative data comprise a distinctly useful improvement over the earlier reports.

After the catalog of artifacts there follows a section on the correspondences and differences between the items from Woodchuck Cave and other Basketmaker II sites of the San Juan drainage. Here the atypical traits are enumerated, such as baskets dyed red on both exterior and interior, feather tassels on the fur robes, a single bean, woodchuck bones (from which the cave derives its name), turkey bones, and the use of the cists exclusively for burial, rather than for storage purposes. However, the bulk of the artifacts are found to correspond to the usual assemblage of Basketmaker II artifacts, and the presence of the atypical traits is explained with due regard for their frequency in this site and their possible existence in other sites of the period.

The publication format and organization of the material used here seem particularly suited to small sites like Woodchuck Cave, but it does not appear to be practical for larger sites. It is, of course, greatly to be desired that more site reports of this nature should appear, and this abbreviated format, in spite of its limitations, seems a possible answer to this need. Failure to publish the results of our excavations is a crime against science of which too many of us are guilty. Perhaps this report will serve as an example of what can be done, whether our field notes have been laid away on the shelves for only one year, or for nineteen.

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Paracas Cavernas and Chavín. A. L. KROEBER, University of California Publications in American Archaeology and Ethnology, Vol. 40, No. 8, pp. 313-48, plates 26-32. University of California Press, Berkeley and Los Angeles, 1953, $.50.

This work is, in effect, a collection of short essays upon various facets of the Peruvian south coast archaeological culture known as Paracas Cavernas. Of primary consideration is a carefully plotted analysis of the Chavín, or Chavín-like, stylistic elements which have been recorded in Paracas Cavernas art. Secondary topics, treated under separate headings or as appendices, are the relationships of Cavernas to Paracas Necropolis and to Nazca, the tracing out of geographical-chronological distributions for the head-bridge-and-spout vessel form in Peru, and a terminal discussion of the accompanying plates which are illustrations of Paracas Cavernas style pottery specimens heretofore unpublished. Prior to this report the illustrated literature on the Paracas Cavernas style consisted of scattered examples shown by Tello (1929), of an important collection photographed and brought out by Kroeber (1944), and of occasional isolated pieces (see Kroeber, work under review, p. 315, for references to these).

In the sections on Chavín comparisons, Kroeber takes issue with me (Willey 1951) over the quantity and quality of Chavín influence in Paracas Cavernas ceramics. In his opinion, Chavín is a significant stylistic strain in Cavernas — a force clear enough and strong enough to imply contemporaneity, or near contemporaneity, between this south coast archaeological culture and such Chavín centers of the north as Cupisnique. Kroeber's analyses of some of the Paracas Cavernas vessels of the Truel collection support his contention that there are elements of Chavín feline designs (i.e., fangs, mouth, nostrils, eyes) in the incised decorations, and I will admit that these elements are combined in a complex that is recognizable as Chavín-like in style. I still retain serious doubts, however, as to the second part of the argument. It appears extremely unlikely, on the basis of present evidence, that the Chavínoid stylistic strains in Paracas indicate a Chavín horizon date. The evaluation of a style as to its purity or its adulteration is, of course, a subjective judgment, but I am inclined to see the Chavín-like features of Paracas as being analogous to those of the residual Chavín elements in certain Mochica vases or to the comparable, but quite different, Chavínoid characteristics of Kuntur Wasi ceramics. In all three of these instances the Chavín qualities (of design and decorative motifs) are imbedded in or blended with other styles. Mochica is demonstrably later than the Chavín horizon, and I also believe that Kuntur Wasi pottery (see Carrión 1948, pls. 22 and 23) is largely post-Chavín. Admittedly, this interpretation has not been proven, but it is a respectable alternative to the as yet unverified hypothesis that Paracas Cavernas is coexistent with Chavín de Huantar or Cupisnique.

The full content of the Paracas Cavernas ceramic assemblage continues to impress me as being post-Chavín. With reference to Krober's comparative chart, it is significant that such Paracas Cavernas traits as the double-spout-with-bridge, and the head-and-bridge-spout vessel forms, and the negative or resist-painting technique do not occur in central or northern Peru in Chavín contexts but are, in all cases, later. There can be only two explanations for these discrepancies in sequence equations: (1) Paracas Cavernas is later than the Chavín horizon and later by an appreciable full period as this is measured in Peruvian chronologies; or (2) the above-named traits all originated on the south coast at a time coeval with the rise of the Chavín style in the north and were diffused northward at a later date. At the present state of knowledge either is an acceptable interpretation. Kroeber prefers the latter. I would choose the former as being the more consistent with the majority of the evidence for Peruvian cross-datings.

To resolve these questions we need more absolute dates from the Peruvian north and south coasts. The two available Carbon 14 dates which bear upon this problem favor the placing of Cupisnique (714 ± 200 B.C.)

as appreciably earlier than Paracas Necropolis (306±200 B.C.) (Johnson 1951, samples 75 and 271). We need, also, intensive stratigraphic studies on the south coast. In this regard, the recent work of Strong and his associates in the Nazca Valley should be of great importance not only for the Chavín-Paracas question but also for the relationships of Paracas Cavernas to Paracas Necropolis and both of these to Nazca culture.

CARRIÓN CACHOT, R.
1948 La Cultura Chavín: Dos Nuevas Colonias: Kuntur Wasi y Ancón. *Revista del Museo Nacional de Antropología, y Arqueología*, Vol. 2, pp. 99-172. Lima.

JOHNSON, FREDERICK (editor)
1951 Radiocarbon Dating. *Memoirs of the Society for American Archaeology*, No. 8. Salt Lake City.

KROEBER, A. L.
1944 Peruvian Archeology in 1942. *Viking Fund Publications in Anthropology*, No. 4. New York.

TELLO, J. C.
1929 *Antiguo Perú: Primera Epoca*. Lima.

WILLEY, GORDON R.
1951 The Chavín Problem: A Review and Critique. *Southwestern Journal of Anthropology*, Vol. 7, No. 2, pp. 103-44. Albuquerque.

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Man, Time, and Fossils. The Story of Evolution. RUTH MOORE. Alfred A. Knopf, N. Y., 1953. xvii+411 pages, 32 plates, 71 figures, $5.75.

This book, surely among the very best of the many recent attempts at "scientific popularizing," is by a Chicago newspaper reporter whose avowed aim and method are expressed in her opening words: "There was only one way in which I could approach the writing of a book on a subject so deep, so moving, and so all-encompassing as the evolution of man. That was as a reporter. The function of a reporter is to tell about, and in one sense to interpret, the work of the expert for the layman. In this case that was an unequaled assignment."

Miss Moore, faithful to her purpose, has evidently taken the time to interview carefully a number of the authorities she has written about, and to read, apparently with equal care, some of the chief sources from which she has drawn her information. The happy and unusual (for a newswriter) results are manifest throughout the book which, as suggested by the title, is subdivided into three logically related parts. The first, "Man's Origins," is a rather broad summary of developments in concepts of biological evolution from Darwin to Wright; the second, "Man's Buried Record," still more limited in scope, is confined to the more recent discoveries of fossil man and his probable forebears in eastern Asia and South Africa; while the third, "A Changed Theory of Man's Evolution," is concerned with the newer methods of temporal reckoning, utilizing uranium, fluorine, and radiocarbon, and with Washburn's experimental approaches to evolutionary problems of mechanical adaptation.

In this reviewer's opinion, Miss Moore has admirably succeeded in clarifying and simplifying, in explaining the significance of, and in sustaining an interest in, for the general reader, such difficult subjects as Wright's theory of diversity and drift and Libby's achievements in radiocarbon dating. Although her style is reportorial, it is not disagreeable to the more advanced reader, while for those whose interest is easily diminished by necessary references to the more methodical aspects of scientific work, there is a liberal leaven of anecdotal biographical items. She has not, however, wholly escaped the overdramatizing tendency of the popularizer. To cite one example from her first section, a whole chapter is given to the more colorful Giard, while the allegedly testy August Weismann is rather curtly dismissed in a single page.

Other instances of selectivity readily occur to the reader, but on the whole he is left with the distinct impression that Miss Moore has made a genuine contribution toward the more liberal education of the multitude who reach for "light amid the darkness" of obscure and recondite regions beyond their ken.

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Graham Cave, An Archaic Site in Montgomery County, Missouri. WILFRED D. LOGAN. Memoir No. 2, Missouri Archaeological Society, Columbia, 1952. 101 pages, 39 figures, $1.00.

This report is an expanded version of an M.A. thesis at the University of Missouri, reporting on work conducted by the author, with the help of other University of Missouri students as well as various members of the Missouri Archeological Society.

Following the introduction and acknowledgments is a brief general discussion of previously reported Archaic units from Missouri and of selected major prepottery units from the eastern United States and Plains areas. A capsule ecological summary describes the environmental setting of the cave; this is followed by an explanatory section which describes and illustrates in detail the excavation methods, stratigraphy, features, burials and artifacts. This last section is the major portion of the report. It is followed by a short "Functional Interpretation of Remains," a "Conclusion and Summary" section, 4 tables, and a bibliography. The last 15 pages of the report comprise an appendix by Carl Chapman covering work at the cave subsequent to that which Logan reports.

An evaluation of the project here reported can only be a positive one. The cave site is a good one, it contains materials which expand our knowledge and understanding of the Archaic period in the Mississippi Valley, and the stratigraphic context gives some clue

to developments within this period. Field work was done in carefully controlled fashion under conditions often less than ideal. Additional excavation is currently being carried out by the Missouri Archeological Society at this important site. The presentation of this material is of the consistently high quality we have come to expect in publications of the Missouri Archeological Society. The text is clearly and carefully organized and quite adequately illustrated with 25 half-tones and 14 line drawings. Some of the finest drawings are those made by Mrs. Chapman for the appendix. Logan has made a valuable contribution in publishing this report and he has presented his evidence in a fashion useful to other workers.

Although there is no specific comparative section in the text, the final unit, "Conclusions and Summary," plus Table 4 (Comparative Trait list), provide this information. Logan's general conclusion is that Graham Cave was first occupied by an Archaic group of people who made artifacts reminiscent of those found on paleo-Indian sites on the Plains. These people, however, were already being influenced by contacts with elements of a generalized Southeastern Archaic culture and this influence became stronger as time went on within the Archaic period. One sherd of fiber-tempered pottery was found associated with the Upper Archaic levels, but the pottery from the top levels represents a late Middle Woodland period occupation.

There are indications from sites in the Plains, the Prairies, and even in the Allegheny Plateau that artifact complexes exist which are typologically intermediate between a generalized paleo-Indian and a generalized Archaic complex. Baerreis (1953) has recently reported a site with such a complex from Wisconsin, MacGregor (1954) describes an Illinois site of this type, and Fowler (1954) has postulated a similar idea in an article outlining dating problems in Illinois.

Graham Cave is a site with this kind of "intermediate" artifact complex. It provides us with a deep excavation context, however, information often lacking from the other sites producing similar complexes. Recent excavations by the University of Chicago and the Illinois State Museum in southwestern Illinois should eventually give us a much better idea of the detailed temporal variations within the long preceramic epoch and should provide evidence for or against Logan's ideas of Southeastern influence. At a rockshelter in Randolph County, Illinois, a neatly stratified deposit carries the nonceramic layers to a depth of more than 26 feet and probably covers the major part of paleo-Indian and Archaic occupation of the Upper Mississippi Valley. If enough artifacts can be recovered from subsequent excavations, this site may well become the key to chronological variation in the preceramic lithic and bone complexes of the Mississippi Valley.

It is quite possible that late in the paleo-Indian period the use of notched projectile points attained some frequency since they are present in fair quantities in the earliest shell-mound Archaic sites. In light of this possibility it would be interesting to compare Graham Cave with the earliest material from Signal Butte. Perhaps Graham Cave was not an early Archaic unit with western orientation that later derived influence from the Southeast, but was rather a unit participating in the general changes and trends taking place in the temporal limbo between our neat categories of paleo-Indian and Archaic. In this interpretation, the earliest occupation of Graham Cave was a typical late paleo-Indian one and the succeeding developments show the expected trend towards, and the final realization of, a typical Archaic occupation.

A further comment by the reviewer may be apropos to this discussion. The presence of ground and polished stone tools is often used as a clue to lateness within the Archaic period. Perhaps this is true when considered statistically in terms of modes, but, lest we fall into the old trap of Paleolithic versus Neolithic, it should be used cautiously. Ground stone work in early Archaic times is indicated by the presence of celts and adzes in Lamoka, and grooved axes, pestles, and other items in the Southeastern Archaic. At Graham Cave manos, mortars, cupstones, a roller pestle, and a hematite adze all occurred in level 6 in association with the lanceolate and fluted points. It appears to me that in our consideration of the limited artifact evidence now available for preceramic cultures, we can profitably apply some of the concepts central to seriation studies. Projectile point and other artifact types might best be considered to have distinctive frequency or popularity patterns in both time and space; artifact complexes or "cultures" can perhaps more usefully be defined on this basis rather than on the presence or absence of "diagnostic" traits. These suggestions are, of course, not new. If, however, more thinking about early cultures is done in these terms we should expect a more complicated archaeological history than can now be demonstrated. And we should be less satisfied with current interpretations.

BAERREIS, DAVID A.

1953 The Airport Village Site, Dane County (Da2). *The Wisconsin Archeologist*, Vol. 34, No. 3, pp. 149-64. Milwaukee.

FOWLER, MELVIN L.

1954 Radiocarbon Dates and Illinois Archaeology, Part II. *Journal of Illinois State Archaeological Society*, Vol. 4, No. 1, pp. 28-32. Springfield.

MACGREGOR, JOHN C.

1954 The Chrisman Site, Illinois River Valley Archaic Culture. *Journal of Illinois State Archaeological Society*, Vol. 4, No. 1, pp. 13-21. Springfield.

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A Key to the Skulls of North American Mammals. BRYAN P. GLASS. Burgess, Minneapolis, 1951. iii+54 pages, 105 figures, spiral binding, $2.00.

This book does much to fill a long-felt need of zoologists, archaeologists and other scientists, for a key to the skulls of North American mammal genera (excepting the marine mammals). This key, like all artificial keys, has its defects, as the author indicates in his introduction, but it is simple and will work in the great majority of cases. In addition to the key the book contains line drawings of the skulls of all genera, and a glossary. Although rather crude, these illustrations are adequate and each is drawn to a separate, indicated scale. No attempt was made to place similarly sized animals on the same plate, hence the skull of a bat appears to be as large as that of the bobcat (p. 18).

The zoologist or archaeologist working with fragmentary skeletal material would prefer more detailed drawings in each case showing the shapes of the component bones and teeth. In the case of the larger animals the scale is too small to allow for indications of the various foramina to be included, thus identification of fragments is rendered even more difficult. There are, in general, enough details shown to enable the investigator to eliminate certain genera and thus ease the task of direct specimen comparison, which is necessary in any case. The key will work satisfactorily provided the major part of the skull and teeth is available. As yet no satisfactory key has been devised for fragmentary material; this book is a step in the right direction and may be used with confidence within the limits described above. Certain minor errors have been corrected in the second printing which is remarkably free from such defects.

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Illustrated Skull Key to the Recent Land Mammals of Virginia. GORDON H. BROWN. Release No. 52-2, Virginia Cooperative Wildlife Research Unit. Blacksburg, Virginia, April, 1952. 75 pages.

Despite the limitations implied in the title, this work covers the land mammals found over most of the eastern United States, since some species are included on the basis of the likelihood of their occurring in Virginia. Unlike the key reviewed above this may be used for the specific identification of skulls. It also includes a glossary and bibliography and, in addition, has labeled morphological drawings for each species, including the dental formula. Under each species only diagnostic parts are illustrated.

As with Glass's key the identification of skull fragments is difficult, since the drawings are not sufficiently detailed. The relative positions of foramina on component bones will often enable one to assign a fragment or disassociated bone to a species, or at least a genus. Since this key and the one reviewed above are for whole skulls such items are omitted. The inclusion of these anatomical details in both works would have made them more useful to the archaeologist and the zoologist interested in subfossils. The ventral view of the carnivore cranium (p. 6) has the arrow indicating the anterior palatine foramina pointing below these foramina which are the black ovals showing in the premaxillary bone. Other such errors have been corrected in a supplemental errata sheet included with the reviewer's copy.

The zoologist is very much interested in both the large and small vertebrate skeletons turned up by the archaeologists' excavations. An example of the type of analysis which could be made of such material is that of Raymond M. Gilmore (*Journal of Mammalogy*, Vol. 27, pp. 227-34, 1946), wherein 13,293 mammal bone fragments from an archaeological site in southwestern Pennsylvania were worked over and 4,403 were identified as to species, thus enabling the zoologist to reach some helpful conclusions concerning the character of the forest cover and climatic conditions existing in the area when the site was occupied. Since many sites can now be dated with reasonable certainty by the radiocarbon technique, such data are especially valuable.

This reviewer believes that, despite the defects listed, these books will be of considerable help in solving mutual problems of identification for both zoologists and archaeologists.

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Potsherds. An Introduction to the Study of Prehistoric Southwestern Ceramics and their Use in Historic Reconstruction. HAROLD S. COLTON. Museum of Northern Arizona Bulletin No. 25. Northern Arizona Society of Science and Art, Flagstaff, 1953. 86 pages, 3 tables, 18 figures, $3.00.

Colton presents this book as a general manual for the study of archaeological pottery, and as an introduction to a contemplated revision of his and Hargrave's *Handbook of Northern Arizona Pottery Wares* which, since its publication in 1937, has been the standard for the typology of archaeological pottery within its area. In the rewriting the text has been somewhat more than doubled in length, and 3 technical appendices have been added. The genetical phrasing of the earlier typology, since subjected to criticism, has been modified. Most of the additional text is devoted to descriptions of ceramic materials and processes, and two chapters treat of the analysis and placement of typed pottery collections, a procedure left undetailed in the earlier handbook.

Colton's approach to ceramic study as shown in this text continues to be primarily concerned with the dating of archaeological remains by sorting sherds into an

objectively defined series of categories. It has for some time been the opinion of this reviewer and of some other workers that Southwestern sherd typology in its present form must be supplemented by studies made with varied orientations before archaeological ceramics can fully tell their story (Beals, Brainerd and Smith 1945: 87-9; Brew 1946: 61-6; Brainerd 1951: 118-19). Although sherd typology has allowed the formulation of an archaeological time-space placement of ceramics with conspicuous success, this fundamental ordering is in the main part complete. Indeed Colton has supplied a major share of the inspiration and hard work used in this task. As has been pointed out by many the organizational framework of Southwest ceramic typology, a family tree arrangement, does not allow for cultural anastomosis, and thus, although adequate for time-space analysis, gives a badly distorted reflection of cultural history. Comparative, rather than taxonomic studies, study of sources of ceramic materials, of origins and diffusion of designs, and of techniques of manufacture, studies on whole designs and shapes rather than on sherds, studies of attributes which often cross the present typological lines, can best supply the data needed on cultural functioning, development, and interrelationships among the regions of the Southwest. And further studies within the framework of the present sherd typology can best be directed toward its refinement, not only as a dating tool, but as a measure of rate of culture change. Statistical studies are the logical technics for this purpose.

There are few leads or devices in *Potsherds* which contribute to the procedures and goals set forth above. Although Colton has done pioneering work toward an understanding of culture contact and population movement in the Southwest (see Colton 1946: 300-11), he does not seem to visualize an intensive pottery study of the sort named above as a tool for such purposes.

In Chapter X titled "Synthesis, ceramic groups and index wares," Colton adopts a method for placement of ceramic collections advanced tentatively in chapter VII of his earlier publication (1937) and since elaborated in a further article (1943). He argues that the plain or utility wares of the collection are diagnostic of the "space element" or "the branch or prehistoric tribe of Indians to which the makers belonged." He calls these *index wares*. The complex of decorated types in the collection is called the *ceramic group* and specifies "time element." This formulation is based on the same dichotomy that Willey has since used in his formulation of "horizon style" and "pottery tradition" in Peruvian archaeology (Willey 1945); but Colton's use of this concept in the present publication is both more stereotyped and more restrictive than Willey's. One suspects that if generally used as advocated by Colton it is certain to force the materials at times into a taxonomic framework which cannot be assumed to mirror culture history without further investigation along more inclusive lines than classifications of one kind of pottery.

One can hope that the use of Southwest ceramic taxonomy will be limited to the placement of materials in the time-space framework, and that after such placement workers will increasingly turn to intensive studies in which any taxonomy used will be newly devised with the goal of the study in view. *Potsherds*, in the reviewer's estimation, is too limited in regional coverage and in theoretical and technical background to serve as a general introduction to archaeological ceramic study. The text on ceramic techniques and materials should be mentioned particularly as containing many inaccuracies and misleading simplifications. *Potsherds* is useful rather as a statement of the status of ceramic sherd typology in the Southwest and should prove stimulating and informative reading to anyone not thoroughly acquainted with the complexities of Southwestern ceramic study.

Anna Shepard's monographs on materials, technics, and design (1936, 1948, etc.) have provided more basic tools for the new types of study advocated here than has the output of any other single worker. There is, however, a wide gap between specific, meticulous findings of this sort, and their simplistic application in present-day sherd typology. The filling of this gap is largely the responsibility of those workers who originate the specialized techniques and can best be accomplished by training of field workers and by publication of carefully written general texts. Miss Shepard has in preparation a general text on pottery study which should be of great help in closing various of the intraprofessional gaps in the application of knowledge which are pointed up by this book.

BEALS, R. L., G. W. BRAINERD AND WATSON SMITH

1945 Archaeological Studies in Northeast Arizona. *University of California Publications in American Archaeology and Ethnology*, Vol. 44, No. 1. Berkeley and Los Angeles.

BRAINERD, G. W.

1951 The Use of Mathematical Formulations in Archaeological Analysis. In "Essays on Archaeological Methods," *Museum of Anthropology, University of Michigan, Anthropological Papers*, No. 8, pp. 117-27. Ann Arbor.

BREW, J. O.

1946 Archaeology of Alkali Ridge, Southeastern Utah. *Harvard University, Peabody Museum Papers*, Vol. 21. Cambridge.

COLTON, H. S.

1943 The Principle of Analogous Pottery Types. *American Anthropologist*, Vol. 45, No. 2, pp. 316-20. Menasha.

1946 The Sinagua. *Museum of Northern Arizona, Bulletin* 22. Flagstaff.

COLTON, H. S. AND L. L. HARGRAVE

1937 Handbook of Northern Arizona Pottery Wares. *Museum of Northern Arizona, Bulletin* 11. Flagstaff.

SHEPARD, ANNA O.

1936 The Technology of Pecos Pottery. In *The Pottery of Pecos*, Vol. 2, pp. 389-587. New Haven.

1948 The Symmetry of Abstract Design. *Contributions to American Anthropology and History*, Vol. 9, No. 47. *Carnegie Institution of Washington, Publication* 574. Washington.

WILLEY, GORDON R.

1945 Horizon styles and pottery traditions in Peruvian archaeology. *American Antiquity*, Vol. 11, No. 1, pp. 49-56. Menasha.

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Field Methods in Archaeology; Prepared for Archaeological Expeditions of the Museum of Northern Arizona. HAROLD S. COLTON. Museum of Northern Arizona, Technical Series, No. 1. Second edition. Flagstaff, 1953. 30 pages, 5 figures, $1.00.

The first edition (1950) of Colton's manual was mimeographed and limited to 100 copies; this is a straight republication which will make the work accessible to a wider audience. The special excellence of excavations carried out by the MNA in the past by the methods detailed in this handbook provide the measure of their worth.

In logical order the following topics are discussed: site reconnaissance with methods of recording data; surface collecting; the requirement of state and federal excavation permit; personnel ("the most important member of the party is the cook"); setting up a field camp; excavation procedures of laying out the site, methods for digging trash mounds, ball courts, houses; care of excavated materials and cataloging; removing skeletal remains; maps, plans, photography; and finally, advice on preparation of field report and preparation for publication.

Although compact, and written for Southwesterners, the methods are generally applicable. As regional manuals are accumulating, the time may be not far away when someone will attempt a manual for North American archaeology as a whole.

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The "Historical Recollections" of Gaspar Antonio Chi. An Early Source-account of Ancient Yucatan. Edited and Translated by M. WELLS JAKEMAN. Brigham Young University Publications in Archaeology and Early History, No. 3. Provo, Utah, 1952. 45 pages.

Gaspar Antonio Chi was a member of the old Maya nobility (a Tutul Xiu on his mother's side) who was educated by the Franciscans and became official interpreter to the government of Yucatan. Unfortunately, we shall never know whether his fellow Maya admired him or despised him for his successful collaboration with the conquerors.

A number of the encomenderos in Yucatan, better wielders of the sword than the quill, called upon Chi to supply them with data pertaining to pre-Spanish Yucatan which they needed to answer certain items in the royal questionnaire of 1577. Chi did his best, but his knowledge of pre-Columbian history was a little vague because he was only about ten years old when Spanish domination was established and because his education and outlook were predominantly Spanish. Moreover, the encomenderos, like those of us who suffer from modern questionnaires, sought to keep their replies as short as they thought they could without getting into trouble. It is, therefore, not surprising that Chi's material is scrappy and at times confusing. Nevertheless, he is a most important source of information, and Jakeman has done a useful piece of work in abstracting and coordinating Chi's *dicta* scattered through the *Relaciones de Yucatan* so that it is neatly presented under the relevant headings of history, warfare, religion, etc.

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Kurze Formen- und Begriffssystematik der Hieroglyphen der Mayahandschriften. GÜNTER ZIMMERMANN. Beiträge zur mittelamerikanischen Völkerkunde, No. 1. Hamburg Museum of Ethnology and Prehistory, 1953. 8 pages, 9 plates.

The study of Maya hieroglyphic writing has been seriously impeded by the lack of a catalog of all known glyphs. This paper is the second which tabulates the glyphs in the 3 surviving Maya codices. The first, issued by William Gates (*An Outline Dictionary of Maya Glyphs*. Baltimore, 1931), recorded all occurrences of all glyphs in the codices, which this paper does not, but the Gates system of designating compound glyphs was poor. Zimmermann uses a far more methodical and practical system. Every affix and main element has a number assigned it, and a compound is designated by the numbers corresponding to each element, while a series of dots and dashes shows the position of each element in the compound. Thus, 42:1341.76 records superfix 42, main sign 1341, and postfix 76. The system was devised for the codices, but will have to be modified slightly for use with monumental texts. For instance, the affixes considerably exceed the 99 numbers assigned them. Moreover, the system only functions if one knows by its number which is the main sign of a compound. All numbers above 100 correspond to main elements in the Zimmermann system. However, main elements often become affixes and vice versa causing a breakdown of the system as at present devised. Nevertheless, the system is basically sound, and such snags can be removed with slight emendations.

In the second part of the paper the author classifies signs in various categories, some of which roughly correspond to groups which I have termed verbal nouns and augural glyphs. One welcomes the return of German scholarship to the field of Maya hieroglyphic decipherment; it has spent too many years in admiring as gold the iron pyrites from theoretical delvings in Maya astronomy.

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A Study of Indian Beadwork of the North Central Plains. Indian Leaflets Nos. 5, 6, 7 of the Science Museum, St. Paul, Minnesota. Sponsored by the Louis W. and Maud Hill Family Foundation, 1953.

For anthropologists the study represented by these 3 brief leaflets would seem to have twofold interest: first, as a contribution to our knowledge of Indian beadwork of the North Central Plains, and, second, as an example of the use of punched cards to manipulate anthropological data.

The format of the publication, 3 sheets of paper printed on both sides, with a folder, describing very briefly the problem, assumptions, procedures, and results, does not lend itself to a clear presentation of the study. It is stated that the "data was compiled on coded punched cards." The method employed was to compile standard lists of traits and then code them. What are termed "data cards" were evidently then manipulated to yield data for chronological lists of specimens and trait distribution charts for comparative study. Unfortunately, it is not described for the reader what sort of punched cards were used, how they were used, how the material was encoded into the punching area of the card and how the cards were sorted.

Punched cards are a documentary tool which is finding more and more favor with social scientists. The use of punched cards in the physical and biological sciences is extensive, for the data of those sciences are particularly suited to punch-card methods. The manipulation of data by punched cards undoubtedly permits a great saving of time in research work. This is particularly noticeable if punch-card methods are substituted for conventional procedures in associational analyses.

There is a considerable literature available on punch card techniques and the reader interested in an introduction to the subject is advised to refer to an article by James W. Perry and Robert S. Casey, "Mechanized Searching" (*Encyclopedia of Chemical Technology*, Vol. 8: Ion Exchange to Metal Plating. New York, 1952, pp. 449-67) and to a book by Robert S. Casey and James W. Perry, *Punched Cards* (New York, 1951). A paper by Albert C. Spaulding (*American Antiquity*, Vol. 18, No. 4, 1953, pp. 305-13) exemplifies the speeds with which data can be handled and some of the possibilities of the application of punch-card techniques to archaeological investigation.

It is stated in the study reviewed here that "these techniques or ones similar to them may provide the historical ethnographer with a useful working tool in studying the dynamics of a changing material culture." It is to be hoped that a fuller report may appear in the near future, for the methods employed, but not described, are undoubtedly of considerable importance in expediting not only studies of culture change but many other problems in anthropological research.

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Chichen Itza: Architectural Notes and Plans. KARL RUPPERT. Carnegie Institution of Washington, Publication 595. Washington, 1952. vi+169 pages, 151 figures (including map), $4.25 ($4.85 cloth).

For various reasons the architecture of Chichen Itza has for years been important in reconstructions of history in Mesoamerica. Several monographs dealing intensively with particular buildings have been published by Carnegie Institution, 3 of them by Ruppert. Here he gives what is essentially a systematically arranged series of short descriptions of many structures not rating more extended individual treatments. The volume greatly broadens the factual base for the commonly accepted "Maya-Chichen" and "Toltec-Chichen" periods, and a final decadent period, at the site. The 3-page Introduction gives a valuable résumé of the characteristics of these periods.

Figure 151, in a pocket at the back, is a reissue of the site map of Kilmartin and O'Neill, "with revisions." Number-letter designations for most structures appear on this map. These, more than a hundred, appear in logical order in the text, whether or not new factual material is provided for a given structure. The map-derived designations of structures excavated by the Instituto Nacional de Antropologia e Historia of the Mexican Government, as well as those which were subjects of major attention by Carnegie Institution, and those excavated many years ago by others, are included. If one ought to look elsewhere for data on any Chichen Itza structure, bibliographic references are provided for that specific structure. Hence the book is a useful tool even for those who may be interested only in some of the more famous structures not actually described here. There is an appendix correlating the more common structure names with the new designations, so that anyone can quickly find what he wants.

Most of the field work resulting in the new data seems to have been by Ruppert himself, working from one end of the site to the other, as time could be spared from major projects. Sometimes it included complete or partial excavation, sometimes surface examination only. He went to every numbered mound. However, there is here included new information on various structures noted as having been excavated by other past or present members of the Carnegie Institution staff — P. S. Martin, S. G. Morley, A. A. Morris, O. G. Ricketson, J. E. S. Thompson, and G. C. Vaillant. An appendix gives Vaillant's apparently contemporaneous report on his excavations of 1926, which included the famous Initial Series temple, and which ought to convince anyone that the lintel was re-used. Another appendix gives an excerpt from a manuscript report by E. H. Thompson on his excavations of 1899-1900.

Plans, often with sections and/or elevations, appear with the notes for a given structure. The latter are tabulated with due regard for easy reference and comparisons, according to a single scheme, with references

to some 34 pages of photographs at the end of the volume.

Most of the new material seems to pertain to the Toltec-Chichen period, which involves sizable as well as small temples, colonnades, ball courts, sweathouses, etc.; but there is also new information on such Maya-Chichen buildings as the Akabzib, Red House, and Temple of the Three Lintels. Though the space accorded any one unit is no more than 2 or 3 pages, one should not suppose that only small, "unimportant" structures are dealt with. So far as the number of units is concerned the book may be said to supply architectural information on a wholesale scale, and I think the plan for accomplishing the purpose has been exceedingly successful. If any criticism may be suggested, it is that a laudable resolve to avoid useless words may sometimes have been carried a bit too far.

LINTON SATTERTHWAITE
The University Museum
Philadelphia, Pa.

CORRECTION

On page 83, Vol. 20, No. 1, the third sentence in Collins' reply to Larsen should be two sentences, reading: "This means that if the radiocarbon dating is correct Ipiutak was only about 250 years older than fully developed Punuk. And yet in this short interval, according to Larsen's reasoning, we would have to squeeze early Punuk and all of Old Bering Sea and Okvik!"

CONSTITUTION AND BY-LAWS OF THE SOCIETY FOR AMERICAN ARCHAEOLOGY *

CONSTITUTION

ARTICLE I — NAME

The name of this organization shall be the SOCIETY FOR AMERICAN ARCHAEOLOGY.

ARTICLE II — OBJECTS

Section 1. The objects of the Society shall be to promote and to stimulate interest and research in the archaeology of the American continents; to encourage a more rational public appreciation of the aims and limitations of archaeological research; to serve as a bond among those interested in American Archaeology, both professionals and non-professionals, and to aid in directing their efforts into more scientific channels; to publish and to encourage the publication of their results; to foster the formation and welfare of local archaeological societies; to advocate and to aid in the conservation of archaeological data; and to discourage commercialism in the archaeological field and to work for its elimination.

Section 2. The practice of collecting, hoarding, exchanging, buying, or selling archaeological materials for the sole purpose of personal satisfaction or financial gain, and the indiscriminate excavation of archaeological sites are declared contrary to the ideals and objects of the Society.

ARTICLE III — POWERS

Section 1. The Society shall have the power to receive, administer, and disburse dues, assessments, and other grants to further its ends; to acquire, hold absolutely or in trust for the purposes of the Society, and to convey property, real and personal; to publish reports, bulletins, journals, and monographs; to affiliate with other organizations in the pursuit of common aims, and to appoint delegates or representatives to such organizations; to establish branches, sections, or divisions, on a regional or functional basis; and to engage in such other activities as are in keeping with the objects of the Society.

ARTICLE IV — MEMBERSHIP

Section 1. The membership of the Society shall consist of two classes: Active Members and Benefactors.

Section 2. Persons in sympathy with the objects of the Society may be elected members. They shall give written subscription to the ideals, objects, and accepted standards of the Society.

Section 3. Residents of any country are eligible for membership.

Section 4. The Society shall not approve of applications for membership from persons who habitually misuse archaeological materials or sites for commercial purposes or who violate accepted standards of professional ethics.

Section 5. The Executive Committee may, by three-quarters vote, remove from the membership rolls any member whose acts are contrary to the ideals, objects, and accepted standards of the Society as set forth in Article II and Article IV, Section 4, or who otherwise makes improper use of his membership. The action of the Executive Committee may be subject to an appeal to the Society at its Annual Meeting.

ARTICLE V — OFFICERS

Section 1. The Officers of the Society shall consist of a President, a First Vice-President, a Second Vice-President, a Secretary, a Treasurer, and an Editor. An Executive Committee shall be comprised of the President as Chairman, the First Vice-President, Secretary, Treasurer, Editor, and four members elected at large, provided that members of the Council shall serve as members of the Executive Committee until the expiration of their terms.

Section 2. Officers shall be elected at the Annual Meeting, shall assume office at the close of the Meeting, and shall serve until their successors are installed. The President and Vice-Presidents shall be elected for terms of one year, the Secretary, Treasurer, and Editor shall be elected for terms of four years. The four members at large of the Executive Committee shall be elected for terms of two years, provided that in the elections in 1948 two members may be elected for a term of one year and two members elected for a term of two years.

Section 3. Subject to general directives and limitations imposed by the membership at the Annual Meeting, any Special Meeting, or by mail ballot, the Executive Committee shall have authority to execute on behalf of the Society all powers and functions of the Society, as defined in Article III and in the By-Laws.

Section 4. The officers of the Society shall not be eligible for re-election until one year has elapsed after their last term of office provided that those who hold office by virtue of elections previous to 1948 shall serve out their terms in that office.

ARTICLE VI — MEETINGS

Section 1. The Society shall hold an Annual Meeting at a time and place to be designated by the Executive Committee. The attending members shall constitute a quorum. At this meeting the business of the Society shall be transacted, archaeological papers and other matters of scientific interest presented, and symposia and discussions may be held.

* Form adopted at the Annual Meeting of the Society, May 16, 1947, with amendments adopted at the Annual Meetings of 1951, 1952, and 1953 and published in AMERICAN ANTIQUITY, Vol. 17, No. 2, p. 169; Vol. 18, No. 2, p. 185; and Vol. 19, No. 2, p. 192.

Section 2. Special, Joint, or Regional Meetings may be called by the President at any time with the consent of the Executive Committee, and shall be called by him upon direction by the Executive Committee. At such meetings the only business which may be transacted shall be that which is specified in the call.

Section 3. An annual meeting of the Executive Committee shall be held before the Annual Meeting of the Society. Special meetings of the Executive Committee may be held at the call of the President. The President shall call a special meeting of the Executive Committee at any time upon the written demand of at least three members thereof.

Section 4. Specific questions may be decided by the Society at its Annual or Special Meetings or by mail ballot.

Article VII — Committees

Section 1. Unless otherwise provided the President shall appoint all committees, representatives, and delegates of the Society with the approval of the Executive Committee. The Executive Committee shall express its approval or disapproval within two weeks of the date upon which nominations are submitted to it.

Article VIII — Amendments

Section 1. This constitution may be amended by a two-thirds vote of the members present at an Annual Meeting or at a Special Meeting. The constitution may also be amended by mail ballot provided that a proposed amendment is approved by two-thirds of the votes cast.

Section 2. Amendments may be proposed by the Executive Committee or by any ten members of the Society. The proposed amendments shall be circulated to the members of the Society by the Secretary at least thirty days before the Annual Meeting or Special Meeting. In the case of a mail ballot, as provided above, the Secretary shall allow thirty days for the return of mail ballots. An amendment shall go into effect immediately upon approval unless otherwise specifically provided.

Section 3. The amendments and provisions of this Constitution, as approved at the Annual Meeting, May 16, 1947, shall be effective immediately upon its adoption and shall supersede and nullify all previous constitutional enactments in conflict with them and all amendments and provisions not mentioned herein. The officers elected at the annual meeting on May 16, 1947, shall complete their terms without required re-election.

BY-LAWS

Article I — Membership

Section 1. Applications for membership in the Society shall be submitted to the Secretary. They shall state the business or professional connections of the applicant and the nature of his interest in American archaeology. Applicants shall be considered subscribers upon receipt of the subscription fee. The Secretary shall elect or reject applications for membership. In arriving at his decision he may consult the members designated under the provisions of Article VI, Section 3. In the event an applicant for membership is rejected he, or three members acting for him, may appeal to the Executive Committee whose decision shall be final.

Section 2. The Annual Dues of Active Members shall be $6.00.

Section 3. Any Active Member may become a Benefactor by the payment at one time of $500.00 or more.

Section 4. Each Active Member shall receive all the Society's publications for the fiscal year covered by his dues and shall have one vote in the transaction of the business of the Society. He shall be eligible for any elective or appointive office in the Society, subject only to retrictions defined elsewhere in the Constitution and By-Laws.

Section 5. Life Members as of May, 1947, and Benefactors shall have during their lives all the privileges of Active Membership but shall be exempt from the payment of dues. Benefactors may designate a library or other scholarly institution which shall, without further payment, receive in perpetuity all the regular publications of the Society. Such publications shall be in addition to those which shall be received by the Benefactor.

Section 6. Any library, museum, university, school, or other institution may subscribe to the publications of the Society without privilege of membership. The annual cost of subscriptions shall be the same as the dues of the Active Members.

Article II — Elections

Section 1. Before June 30th of each year the President shall submit a list of at least six names to the Executive Committee. From this list the Executive Committee shall, by preferential voting, elect a Nominating Committee of three.

Section 2. The names of the members of the Nominating Committee and their addresses for any given fiscal year shall appear in the second number of Antiquity for that year, following the minutes of the Annual Meeting for the preceding year. There shall also be a listing of the vacant offices for which nominations will be made for the ensuing year with a notice that members may suggest the names of candidates for such offices to the Nominating Committee before December 1. For the offices of Secretary, Treasurer, and Editor the Nominating Committee shall nominate a member candidate. For the other offices the Nominating Committee *may nominate no more than three member candidates.* All prospective nominees must indicate in writing to the Nominating Committee their willingness to serve as an officer subject to the provision of the Constitution, Article V, Section 4. The list of nominees shall be sent to the Secretary by March 1 for

distribution to the individual members of the Society in accord with the provisions of Article II, Section 4 of the By-Laws.

Section 3. The President shall appoint without review by the Executive Committee, and whenever necessary, two tellers who shall act with the Secretary as an Elections Committee. The Secretary shall be chairman of the Committee. Elections shall be administered by this Committee.

Section 4. Voting shall be by mail ballot distributed to the membership by the Secretary at least thirty days in advance of the Annual Meeting. The result of the election will be announced by the Elections Committee at the Annual Meeting. The candidate for an office receiving the highest number of votes shall be declared elected to that office. In the event of a tie vote, the Elections Committee shall hold a run-off election at the Annual Meeting.

Article III — Duties of Officers

Section 1. The President shall be the presiding officer of the Society.

Section 2. The President and either the Secretary or the Treasurer shall sign all written contracts authorized by the Executive Committee, except that basic contracts for printing and other matters necessary to publication shall be signed by the President and Editor.

Section 3. The First Vice-President shall assume the duties of the President in the event of the absence, death, resignation, or incapacity of the President.

Section 4. The Second Vice-President shall assume the duties of the First Vice-President in the event of the absence, death, resignation, or incapacity of the President or of the First Vice-President.

Section 5. The Secretary shall maintain the central office of the Society, which shall serve as a clearing house and advisory center on archaeological matters. He shall have general charge of administrative matters under the direction of the President. He shall act as Secretary of the Executive Committee. He shall make an annual report. He shall transmit to the Editor all information of general archaeological interest. He may, subject to authorization and budgetary provision by the Executive Committee, employ clerical assistance.

Section 6. The Treasurer shall administer the finances of the Society subject to the budget and other regulations approved by the Executive Committee. He shall maintain proper and adequate records which at all times shall be open to the inspection of the Executive Committee. Prior to each Annual Meeting he shall submit a budget for the ensuing year to the Executive Committee. He shall render an annual report. He shall maintain the membership list and provide the mailing list for publications of the Society. He shall have charge of the care and sale of surplus copies of publications. He may be required to give bond and may, subject to authorization and budgetary provision by the Executive Committee, employ clerical assistance.

Section 7. The Editor shall have full charge of all publications of the Society under the direction of the Executive Committee. He may, with the approval of the Treasurer, enter into agreements with individuals and institutions for financing publications. He shall certify to the Treasurer all bills relating to publishing obligations. He shall render an annual report. He may, subject to review by the Executive Committee, appoint Associate and Assistant Editors who shall, as far as practicable, represent the various geographic or cultural areas and fields of interest in American archaeology. The Associate and Assistant Editors shall serve concurrently with, and under the direction of, the Editor and shall be responsible to him. The Editor may, subject to authorization and budgetary provision by the Executive Committee, employ clerical and editorial assistance.

Article IV — Affiliations, Branches, Etc.

Section 1. Independent Societies whose objects are compatible with those of the Society for American Archaeology may become branches, sections, or divisions by vote of the Annual Meeting, provided that the presiding officer and at least half the membership of such independent Societies shall be and remain members of the Society for American Archaeology.

Article V — Meetings

Section 1. Due notice of the place and date of the next Annual Meeting and of the list of nominees for vacant offices shall be given all classes of membership at least two months in advance. In so far as practicable, announcements, accompanied by a preliminary program, shall be sent to members at least two weeks in advance of the date of the meeting. Notices of special meetings shall be sent to members at least one month in advance.

Article VI — Committees, Appointments, Etc.

Section 1. The President shall appoint, as provided in Article VII, Section 1 of the Constitution, Auditing and Program Committees, which shall hold office for one year or until their successors are installed. He may appoint, as provided in Article VII, Section 1 of the Constitution, such additional committees as may from time to time be required.

Section 2. The President shall appoint, as provided in Article VII, Section 1, of the Constitution, delegates or representatives of the Society.

Section 3. The President may designate without review members in various regions to advise the Secretary concerning the qualifications of applicants for membership and concerning the status of archaeological research in the respective regions.

Article VII — Duties of the Executive Committee

Section 1. The President may, on his own initiative, or shall, at the written request of any member of the Executive Committee, ask the Committee to vote on specific questions by mail ballot.

Questions shall be decided by the Executive Committee by a majority of the votes cast. A quorum of the Executive Committee shall consist of a majority of its membership. In the case of a tie vote the decision of the President shall be final. If any member of the Executive Committee is unable to attend a meeting he may, by written proxy, appoint another member of the Society to attend and vote in his stead. But no person by virtue of holding proxies shall have the right to cast more than one vote.

Voting may be held at a meeting of the Committee or by mail. In the event of a mail ballot the date by which the ballots must be received in order to be counted shall be specified in the call.

Section 2. The Executive Committee shall have the power to make interim appointments to fill a vacancy in an office until elections are held.

Section 3. At its annual meeting the Executive Committee shall take action on the budget presented by the Treasurer.

Article VIII — Mail Ballot

Section 1. Questions may be submitted to the members of the Society and voting thereon may be by mail ballot upon the initiation of the Executive Committee or a signed petition to the Executive Committee by any ten members. The ballots shall be returned within sixty days to the Secretary who shall certify the vote to the Executive Committee. A majority of the votes received shall constitute a deciding vote.

Article IX — Annual Report

Section 1. The Secretary shall compile the minutes of the annual meeting of the Society which shall include the reports of all officers, committees, delegates, and representatives required to make such reports. The minutes shall be published in the journal.

Article X — Finances

Section 1. The fiscal year of the Society shall begin May 1.

Section 2. Annual dues shall be payable on May 1. Members 90 days in arrears shall not be entitled to receive the Society's publications or to vote, and those one year in arrears may, after final notification, be dropped from the rolls. Members thus dropped may be reinstated by payment of their arrearages, in which case they shall receive the withheld publications, or they may be reelected.

Section 3. Payments made to establish Life Memberships and Benefactorships, and such other moneys as may from time to time be designated for that purpose, shall constitute a Permanent Fund which shall be invested in the name of the Society. The Executive Committee may direct the transfer of sums of money from the Permanent Fund to the Working Fund provided that the total of the Permanent Fund is never reduced below the total sum of payments of all living Life Members, all Benefactors, and all sums which must remain in the Permanent Fund by conditions under which they may have been received.

Section 4. The income from annual dues and from investments and other sources shall constitute the Working Fund, available for such publications and other current expenses consistent with the purposes of the Society as the Executive Committee may direct.

Section 5. The Trustees of the Permanent Fund shall consist of two members of the Society and the Treasurer, *ex officio*. The Trustees shall be appointed by the Executive Committee for terms of eight years, provided that in 1947 one Trustee shall be appointed for a term of four years.

Section 6. No financial obligation in excess of funds available in the treasury shall be assumed by the Executive Committee or by any officer on behalf of the Society except when approved by a two-thirds vote of the membership of the Society present at a regular Annual Meeting or at a Special Meeting; provided that for the purpose of this section, estimated receipts from annual dues for the current year may be considered as available funds.

Article XI — Amendments

Section 1. These By-Laws may be amended by a majority vote at a regular or special meeting of the Society, or by mail ballot.

Section 2. The provisions of these By-Laws, as approved May 16, 1947, shall be effective immediately upon their adoption and shall supersede and nullify all previous enactments in conflict with them. The proceedings at the Annual Meeting in May, 1947, shall stand without further confirmation.

ANNUAL MEETING OF THE SOCIETY FOR AMERICAN ARCHAEOLOGY, 1954

The nineteenth annual meeting of the Society for American Archaeology was held on Friday and Saturday, May 7 and 8, 1954, at the Ten Eyck Hotel, Albany, New York. Total registration at the meeting was 98, but a number of late arrivals increased attendance to an estimated 125 persons.

MEETING OF THE EXECUTIVE COMMITTEE

As required by Article VI, Section 3 of the Society's Constitution, the annual meeting of the Executive Committee was held prior to the annual business meeting of the Society. An account of this meeting is included in the report of the Secretary.

ANNUAL BUSINESS MEETING

The annual business meeting of the Society was called to order by President Gordon F. Ekholm at 4 p.m. on Friday, May 7, 1954. About 60 members were present.

The minutes of the eighteenth annual meeting were approved as published in *American Antiquity*, Volume 19, No. 2, pp. 192-6 (October, 1953).

The report of the Secretary was read and accepted (see page 197 for this report).

The report of the Treasurer (see page 198 for this report) was read and accepted on the recommendation of the Auditing Committee (James A. Ford, chairman; W. Duncan Strong; William J. Mayer-Oakes).

The proposed budget for 1954-1955 as approved by the Executive Committee was presented to the membership and accepted.

The report of the Elections Committee (Albert C. Spaulding, chairman; J. Alden Mason, Arthur G. Smith) was read and accepted. The result of the mail ballot (331 acceptable ballots received) was:

President: Robert Wauchope
First Vice-President: Carlyle S. Smith
Second Vice-President: J. Charles Kelley
Secretary (two year term): Albert C. Spaulding
Editor: Richard B. Woodbury

Members of the Executive Committee (to 1956): Ralph L. Beals, Clifford Evans, Jr.

The report of the Editor was read and accepted (see page 199 for this report), and the membership offered a vote of thanks to the retiring editor, Jesse D. Jennings, for his effective service.

A statement on the qualifications of professional archaeologists prepared by Frank H. H. Roberts, Jr., and Waldo R. Wedel, a subcommittee appointed for the purpose by the Executive Committee, was read by Roberts. After extended discussion, the membership voted to authorize the President to circulate the report to the membership for study and possible adoption as the official statement of the Society.

President Ekholm announced that the Society had received an invitation to hold the 1955 annual meeting at Bloomington on the campus of the University of Indiana and called for other invitations. There being no other invitations, the membership voted to accept the University of Indiana invitation.

Frederick Johnson presented a report for the Committee for Recovery of Archaeological Remains, summarizing the accomplishments of the Committee, pointing out the debt owed by archaeology to the people responsible for the accomplishments, and recommending that additional funds be made available to continue the Committee's work (see page 200 for this report).

It was suggested from the floor that in the future amateur archaeologists in the general vicinity of the annual meeting be urged to attend the meeting. It was further suggested that this duty was an appropriate one for any local archaeological society which might exist.

The following resolutions were presented by the Committee on Resolutions (John Corbett, chairman, and John L. Cotter) and accepted:

Resolved: That the Society for American Archaeology express its thanks and deep appreciation to the New York State Museum for its kind hospitality and to Dr. William A. Ritchie, who acted as chairman of the program committee and who so very ably made all the local arrangements for this annual meeting.

Resolved: That the Society for American Archaeology express its gratitude to the outgoing officers of the Society and its appreciation to these officers for their industrious efforts on behalf of the Society, especially the editor, Dr. Jesse D. Jennings and his editorial staff, who have labored long and hard to improve both the standards and quality of our journal, and to the University of Utah Press which has been exceptionally cooperative and helpful in publishing *American Antiquity*.

Resolved: That the Society for American Archaeology express its deep sense of loss in the death of Dr. Ralph Linton and of Dr. Wendell C. Bennett, and that the Secretary be instructed to convey to their survivors the sympathy of the Society and to send them a copy of this resolution.

The annual business meeting adjourned at 5:35 p.m.

ANNUAL DINNER

The annual dinner of the Society was held at the Ten Eyck Hotel on Friday, May 7, at 7:00 p.m. with an attendance of 74. Following the dinner, W. Duncan Strong presented an illustrated address on "Recent Archaeological Discoveries in Southern Peru."

OTHER SESSIONS

Friday Morning, May 7. *Midwestern Archaeology*. George I. Quimby, Jr., Chairman.

1. Melvin L. Fowler and Harold Winters: "A Rock-shelter with Deep Deposits in Southwestern Illinois."
2. J. Charles Kelley: "Archaic Sites of Southern Illinois."

3. William J. Mayer-Oakes: "Excavations at the Globe Hill Site."
4. Don W. Dragoo: "The Watson Site, a Middle Woodland Manifestation in the Upper Ohio Valley."

Friday Afternoon, May 7. *Northeastern Archaeology.* Irving Rouse, Chairman — Alfred K. Guthe, Discussion Leader.

1. Douglas S. Byers: "The Maritime Culture of the Northeast."
2. Carlyle S. Smith: "Preceramic and Early Ceramic Horizons in Coastal New York."
3. Maurice Robbins: "The Assawompsett Site in Massachusetts."
4. Valerie Burger: "Archaeological Discoveries on the Shores of Kempt and Manowan Lakes in the Province of Quebec."
5. William A. Ritchie: "Evidence for an Early Woodland Burial Cult in the Northeast."

Saturday Morning, May 8. *General Archaeology.* James A. Ford, Chairman.

1. William H. Sears: "Creek and Cherokee, 1700-1750."
2. John L. Cotter: "Is There a Paleo-Indian Co-tradition in North America?"
3. J. Louis Giddings, Jr.: "A New Kind of Artifact from the 'Burin Sites.'"
4. Douglas Leechman: "Pictographs of Southeastern British Columbia."
5. Wesley R. Hurt, Jr.: "The Mississippi Pattern in South Dakota."

Saturday Afternoon, May 8. *General Archaeology.* Jesse D. Jennings, Chairman.

1. Howard A. MacCord and S. Kodama: "The Okhotsk Culture, a Protohistoric Culture of the Northeastern Asiatic Littoral."
2. Irving Rouse: "On the Correlation of Phases of Culture."
3. Frederick R. Matson: "Charcoal Concentration from Early Sites for Radiocarbon Dating."
4. Blanche Miller: "Archaeology Through Amateur Eyes."
5. C. W. Weiant: "Moxviquil: A Highland Maya Site in Chiapas."

REPORT OF THE SECRETARY

Committees. The following committees were appointed by President Gordon F. Ekholm and approved by the Executive Committee as required by the Constitution and By-Laws of the Society.

Nominating Committee: William G. Haag, Chairman; Glenn A. Black; and John M. Corbett.

Viking Fund Award Committee: Gordon F. Ekholm, Chairman Ex Officio; Lauriston Ward; Edwin N. Ferdon, Jr.; J. Louis Giddings, Jr.; J. Charles Kelley; Clifford Evans, Jr.; George W. Brainerd; Robert Wauchope; Alfred Kidder II; John H. Rowe; Carlyle S. Smith; Frank H. H. Roberts, Jr.; and H. Marie Wormington.

Program Committee: William A. Ritchie, Chairman; Douglas S. Byers; and Irving Rouse (with J. Charles Kelley as honorary member).

Committee on Local Arrangements for Nineteenth Annual Meeting: William A. Ritchie, Chairman.

Auditing Committee: James A. Ford, Chairman; W. Duncan Strong; and William J. Mayer-Oakes.

Committee on Resolutions: John Corbett, Chairman, and John L. Cotter.

Elections Committee: Albert C. Spaulding, Chairman; J. Alden Mason; and Arthur G. Smith.

Other Activities. President Ekholm with the consent of the Executive Committee appointed Albert C. Spaulding as Acting Secretary to replace James B. Griffin, and William J. Mayer-Oakes as Treasurer to replace Richard B. Woodbury.

In accordance with the approval of the Executive Committee at the 1953 annual meeting, President Ekholm took the necessary steps to complete affiliation with the American Association for the Advancement of Science. Notification of approval of affiliation by the Committee on Affiliation and Association and the Board of Directors of the American Association for the Advancement of Science was announced on October 28, 1953. The President appointed Douglas S. Byers as representative of the Society to the Council of the American Association for the Advancement of Science for 1953 and T. D. McCown for 1954.

The Nominating Committee presented the following names for the consideration of the membership: for President — John L. Champe, Robert Wauchope; for First Vice-President — Henry W. Hamilton, William S. Laughlin, Carlyle S. Smith; for Second Vice-President — J. Charles Kelley, Clarence H. Webb; for Secretary (two year term) — Albert C. Spaulding; for Editor — Richard B. Woodbury; Executive Committee Member (to 1956) — Ralph L. Beals, John L. Cotter, John Witthoft; Executive Committee Member (to 1956) — Clifford Evans, Jr., Hale G. Smith, Marvin E. Tong.

As required by the Constitution and By-Laws of the Society, names and addresses of the nominating committee and the offices to be filled at the 1954 election were listed in *American Antiquity*, Vol. 19, No. 2, following the report on the annual meeting of 1953; the place and date of the annual meeting were announced to all members more than two months in advance and programs were mailed to the membership more than two weeks in advance of the meeting date; the list of nominees was sent to the membership on March 1, 1954, and the ballots were mailed more than 30 days before the annual meeting.

The Secretary's office conducted the usual correspondence relating to applications for membership and other matters, prepared a new copy of the Constitution and By-Laws for publication in *American Antiquity*, and prepared a short history of the Society in connection with the application for affiliation with the American Association for the Advancement of Science. The Secretary received much assistance from the members in the membership drive. Recruiting by individual members and by local societies was effective. The Treasurer prepared a list of all members recently dropped, and the Secretary sent to each of them an invitation to rejoin the Society. It is planned to circularize a list of American libraries not subscribing to *American*

Antiquity, an activity made possible by the volunteer preparation of the list by Marvin E. Tong.

The Executive Committee accepted the report of the Viking Fund Award Committee. Gordon R. Willey was designated as the recipient of the award.

The Executive Committee approved Albany, New York as the place of meeting for 1954.

As required by the Constitution, the Executive Committee held its annual meeting on May 6, 1954, and took the following actions:

1. Accepted the preliminary report of the Secretary.

2. Accepted the Treasurer's report, authorized the Treasurer to transfer $600 from the publication fund to the operating fund in connection with the publication of Memoir 10, and approved the action of the Treasurer in including in the general balance the sum of $972.19 allocated in 1952 for the expenses of the membership drive but so far unused. The Treasurer was authorized to issue to the Secretary funds not exceeding $300 annually to be expended in the membership drive.

3. Accepted the proposed budget for 1954-1955 with the provision that $800 rather than $600 be allotted for editorial assistance, the additional $200 to be obtained by increasing charges to authors.

4. Approved the banking of the Society's funds with those of the American Anthropological Association by the Executive Secretary of the American Anthropological Association.

5. Approved the publication of Memoir 10 jointly with the American Anthropological Association.

6. Ruled that memoirs whose stock has been depleted to 25 or fewer copies may be sold only as parts of complete sets.

7. Accepted the report of the Editor and expressed gratitude to the retiring Editor and to the University of Utah Press for their efficient service.

8. Approved the report of the subcommittee on qualifications of professional archaeologists (Frank H. H. Roberts, Jr., and Waldo R. Wedel) for presentation to the annual meeting.

9. Approved continuation of the membership drive by the Secretary.

10. Requested Frederick Johnson to present a report on the Committee for the Recovery of Archaeological Remains to the membership at the annual meeting.

11. Appointed George I. Quimby as the Society's representative to the Committee on Programs of the International Congress of Anthropological and Ethnological Sciences; Clifford Evans, Jr., and W. Duncan Strong as delegates to the International Congress of Americanists (Brazil); and Gordon F. Ekholm and Isabel Kelly as delegates to the Mesa Redonda (Mexico City). In the case of the latter two meetings, it was recommended that additional appointments be made if possible.

12. Approved acceptance of an Indiana University invitation for the 1955 annual meeting if no other invitations were received at the annual business meeting.

13. Instructed the Secretary to communicate with the National Park Service requesting full consideration for archaeological salvage and development in connection with the construction of the Mississippi River Parkway.

14. Discussed a number of suggestions on various matters not requiring official action.

Respectfully submitted,

ALBERT C. SPAULDING, *Acting Secretary*

REPORT OF THE TREASURER

As in previous years the major part of our income went toward the cost of preparing, printing, and distributing *American Antiquity*; we owe our solvency more to the skill of the editor and press in keeping costs down than to any important increase in our income. It is necessary to charge authors a substantial part of the cost of illustrations, as well as virtually the entire cost of reprints.

Unfortunately, an increasing amount of money is necessary to run the essential business of the society — correspondence and record-keeping, billing members for dues, selling back issues, circularizing the membership for elections and notices of meetings. Actually, most of this work is done voluntarily and without any remuneration by the various officers of the society, but increasingly they are finding it necessary to ask reimbursement for postage and stationery, for typing and printing, and such other expenses as they can neither pay for personally nor absorb in the budgets of museums and departments.

At the present an increase in dues would seem injudicious, but an increase in income highly desirable. New members would ease our financial position and also advance the basic purposes for which the society was founded. Substantial gifts have been conspicuously absent in our account books for some time, and would, of course, be extremely welcome at any time. The extent of our publishing activities in particular and of our occasional general activities in the interests of archaeology are definitely tied to our purse strings, so that continued substantial growth in income appears essential for the well-being of the society.

Membership:	Individual	917
	Institutional	252
	Life	10
	Total	1,179

RECEIPTS AND EXPENDITURES

May 1, 1953 through April 30, 1954

A. *OPERATING FUND*

1. RECEIPTS

a. Balance forward May 1, 1953		$2,739.61
b. Dues received 1953-54		6,707.54
c. Prepaid dues for 1954-55		183.00
d. Sale of back issues of *American Antiquity*		302.57
e. Sale of Memoirs		254.87
f. Reprint charges to authors		924.26
g. Excess engraving charges to authors		710.50
h. Overpayments (subsequently refunded)		39.70
Total		$11,862.05

2. EXPENDITURES

a. Printing *American Antiquity*	$5,964.47	
b. Distributing *American Antiquity*	244.26	
c. Printing authors' reprints	1,032.57	
d. Editorial assistant (5 issues)	800.00	
e. Editor's office expense	141.03	
f. Associate editor's office expense	18.50	
g. President's office expense	19.39	
h. Secretary's office expense	47.25	
i. Treasurer's office expense	218.29	
j. Establishing office for dues and sales (non-recurring item)	150.00	
k. Charge for collecting dues, at $ .25 ea.	287.00	
l. Annual meeting, May 1953	20.00	
m. Annual meeting, May 1954	110.59	
n. Refund of overpayments	39.70	
Total		$ 9,093.05
3. CASH BALANCE May 1, 1954		$ 2,769.00
4. OUTSTANDING May 1, 1954		
a. Accounts receivable	$ 308.45	
b. Liabilities		
1. Charges payable	$ 32.69	
2. Prepaid dues	183.00	
	$ 215.69	
Balance		$ 92.76
5. TOTAL ASSETS, OPERATING FUND		$ 2,861.76

B. *PERMANENT FUND*

1. Deposited in Irving Savings Bank, N.Y., May 5, 1953	$ 646.66
2. Interest (less $1.00 service charge)	12.67
3. Total on hand April 30, 1954	$ 659.33

C. *PUBLICATION FUND*

1. Deposited in Irving Savings Bank, N.Y., May 5, 1953	$1,598.67
2. Interest (less $1.00 service charge)	32.80
3. Total on hand April 30, 1954	$1,631.47

BUDGET FOR 1954-1955

Receipts

a. Balance brought forward	$ 2,750.00
b. Dues for 1954-55 (at 1180 members, less prepaid dues)	6,900.00
c. Prepaid dues for 1955-57	100.00
d. Sale of back issues of *American Antiquity*	300.00
e. Sale of Memoirs	200.00
f. Reprint charges to authors	900.00
g. Excess engraving charges to authors	850.00
h. Transfer from Publication Fund	600.00
Total Receipts	$12,600.00

Expenditures

a. Printing *American Antiquity*	6,500.00
b. For Memoir 10	600.00
c. Distributing *American Antiquity*	250.00
d. Printing authors' reprints	1,000.00
e. Editor's office expense	250.00
f. Editorial assistant	800.00
g. Associate editor's office expense	50.00
h. President's office expense	50.00
i. Secretary's office expense	50.00
j. Treasurer's office expense	100.00
k. Charge for collecting dues	300.00
l. Annual meeting	150.00
m. Subsistence at annual meeting (Pres., Sec., Treas., Ed., if necessary)	100.00
n. Balance forward, May 1955	2,500.00
Total Expenditures	$12,600.00

Respectfully submitted,

RICHARD B. WOODBURY, *Treasurer*

REPORT OF THE EDITOR

During the year 1953-54, the Society published Volume 19 of *American Antiquity*. No memoir was published, although two manuscripts were reviewed. Volume 19 contained 440 pages. As of February 15, 1954, a total of 62 manuscripts had been received; 12 of these were rejected, while 5 were returned to authors for modification. After February 15 all manuscripts were referred to the new editor. I am advised, that as of May 1st the backlog of manuscripts is adequate for two and one-half issues ahead.

Manuscripts continue to be of good quality and variety. In Volume 19 were 19 major articles, 36 Facts and Comment articles, and 23 Book Reviews, as well as the Notes and News, Awards, and the other usual features. A new feature, a Checklist of Regional Publications, was added but excited no comment.

Printing costs increased about 10 per cent July 1, 1953, as we were warned would be the case. Evidently the increased support from about 1175 members, including institutional, and from the sale of back issues has kept us comfortably solvent.

Inasmuch as the editorship is changing, perhaps a brief review of the labors experienced by the outgoing editor will not be out of place. The four-year term of editorship, during which Volumes 16, 17, 18, and 19 were printed, can be quantitatively summarized as follows:

From May 8, 1950, to February 15, 1954, a total of 263 manuscripts (not including memoirs and book reviews) were received. Of these 33 were rejected; 38 were returned for modification. Published materials include 97 major articles, 116 Fact and Comment articles, 166 Book Reviews and Book Notices, and a number of features including current *Notes and News, Necrologies, Some Recent Publications, Awards, Reports of Annual Meetings, Membership Lists*, and scores of special notices of interest. In addition two Memoirs — *Radiocarbon Dating* (No. 8) and *Transpacific Contacts* (No. 9) —

both of which were symposia, were published. Total pages in the four volumes reached 1844.

The University of Utah Press has done the printing and mailing for the Society since June 1, 1950; our relations with Press personnel have been very cordial and for the editor, highly valuable. As was previously reported, the Press has agreed to retain the Society account.

One pleasure in giving up the editorship lies in the opportunity once more to acknowledge the advantages and pleasures I have experienced in my association with the associate and assistant editors, with the scores of authors, with the officers of the Society for American Archaeology, with the personnel of the University of Utah Press, with the librarians at the University of Utah, and with the members of the Society at large. No editor, I am certain, was ever blessed with cooperation so full and all-pervasive as I have received. Especially I am indebted to my wife whose skill in copy- and proof-reading was a continuing comfort.

As we all know, there is now active solicitation of archaeological articles for the *American Anthropologist*. This means that there will be keen competition for high level articles dealing with synthesis or with new ideas. Each member of the Society is urged to submit manuscripts to the Society editor first. It seems to me that *American Antiquity*, as the official voice of American Archaeology, should contain the high level articles. If we continue to support the magazine in the strong way that it has been supported the last few years, an increased membership in the Society can be expected.

In this, my next to last sentence, I wish to echo the words of my predecessor, Irving Rouse, by saying, "It has been both a privilege and an educational experience to have served as editor for the Society."

Finally, I pledge never again to take an editor, or evidence of his labor, for granted.

Respectfully submitted,
JESSE D. JENNINGS, *Editor*

REPORT OF THE COMMITTEE FOR RECOVERY OF ARCHAEOLOGICAL REMAINS

During the past two or three years a number of developments have in various ways affected the Inter-Agency Archaeological Salvage Program. The basic need for, and objectives of, the program still remain but the changing conditions have modified to some extent operation and administration. Theoretically and to some extent actually these changes have been for the better. However, a serious lack of financial support recently combined with what appear to be changes in federal policy are reasons for reviewing the whole endeavor in order to find, if possible, other means for the prosecution of urgent work. Certain of these matters were considered either directly or by implication at the annual meeting of the Committee in November 1953; subsequent conversations have served to clarify a number of points albeit incompletely.

The purpose and objective of the program is to protect archaeological areas on all federally owned land where the Antiquities Act and Historic Sites Act is involved. When construction or other developmental activities threaten archaeological sites, this program is designed to conserve and salvage the archaeological values. The work is carried on through important liaison with the Corps of Engineers and the Bureau of Reclamation in the River Basins. Liaison with Federal Power Commission promises to result in the salvaging of archaeological values in private reservoirs and other developments. Under the authority of the Antiquities Act, the Historic Sites Act, and various directives and interpretations, material important to scientific knowledge is preserved, the results of field work and research is published, and representative collections or materials recovered are made available to state and local institutions.

There is an impressive record of accomplishment since the fall of 1945 when organization of the program commenced and 1946 when the first party was sent to the field. By June 30, 1953, $372,000 in federal funds and $117,925 in local organizations' funds and services had been expended on work outside the Missouri Basin. In the Missouri Basin federal expenditures amounted to $1,082,530 and 10 universities and other institutions in 8 states contributed, or are contributing, an estimated $10,000.00. In other words, during 7 years of field work a sum in excess of $1,662,000 has been spent for the purpose of preserving a representative portion of archaeological knowledge which was threatened with destruction.

Outside the Missouri Basin 171 reservoir areas have been surveyed and excavations have been carried on in 61 of these. In the Missouri Basin some 153 reservoir areas have been surveyed and in 40 of these excavations carried out. Three thousand four hundred and sixty-nine archaeological sites, most of them new to science, have been recorded and 852 of these have been recommended for excavation or further testing. In addition, palaeontological investigations have been made in 121 reservoir areas.

The results of the work are of the utmost importance. The knowledge which has been gained has without question been of great significance in the recent developments in the science of archaeology. Furthermore, if this knowledge had been allowed to perish many events in prehistory would have been unknown to us and the interpretation of the occupation of the continent would have been erroneous or, in some instances, impossible.

The success of the endeavor is due to the enthusiastic cooperation of many people and their agencies in the federal government. The National Park Service has handled the fiscal problem with great skill and foresight. The Bureau of American Ethnology of the Smithsonian Institution has made it possible for Dr. Frank H. H. Roberts to direct a large part of the scientific work. The Corps of Engineers and the Bureau of Reclamation have provided support and assistance far beyond that required by regulations. Archaeologists, as well as

interested citizens of the country, are deeply indebted to government officials for the successful development of the work which took place sometimes in the face of considerable difficulty.

Of equal significance is the collaboration of local and state institutions. Thirty-seven such organizations have done a great deal of work, often at the expense of their own established programs. The resources of universities and museums are notoriously inadequate. To record that from such sources in excess of $208,000 in funds and services, not including all salaries, has been devoted to the salvage work is a significant measure of the unqualified support of the objectives of the program.

An adequate estimate of the scientific achievements is difficult to make. At the present time archaeologists are in the process of compiling the initial definitive reports on the field work. This is an arduous time-consuming task which produces for general consumption basic data which can only be partially interpreted. There is no question but what analysis, even of materials gathered so far, will continue for many years. Mimeographed and illustrated preliminary appraisal reports on the surveys of every reservoir area have either been prepared or are being compiled. One hundred seventy-two of these have been released. Forty-five manuscript reports from Smithsonian excavations have been accepted for publication by Dr. Roberts. Several of these have been published in American Antiquity during the past 5 years. Two issues of the Journal have been devoted exclusively to River Basin Archaeology. Bulletin 154 of the Bureau of American Ethnology includes 6 "River Basin Papers" and a second similar Bulletin is being prepared. Seventeen published papers in nearly as many journals stem directly from the salvage work. Publications of the work of cooperating organizations are also appearing.

From the beginning, the administration of the program has been under continuous scrutiny. Various modifications have been made so that management within the framework of the government might be more efficient thus making certain that the scientific objectives could be reached. At the present time the National Park Service is supervising work in its several regions, the personnel concerned with salvage work being responsible to the regional offices. The Smithsonian remains responsible for the Missouri Basin and certain work in the east. Dr. Roberts is in charge of the Smithsonian's part of the program and acts as adviser and consultant to the Park Service. This arrangement has been in force a relatively short time but it appears to be satisfactory.

There are indications that the program will be subject to a number of important modifications, perhaps beginning in the near future. It appears certain that in the future the need to salvage archaeological materials will be as urgent as at present and possibly even this need may increase. However, changes which are taking place in the federal government promise to limit seriously funds to support the work at least during the next few years. It may be, also, that some changes in the manner of administration of the salvage program will be necessary. There is no way of determining at the moment what modifications may actually be necessary or advisable but a glance at the present situation serves to outline some of the general problems.

One of the most vital problems is the financing of the work. In past years, work outside the Missouri Basin has suffered from serious lack of funds. For unknown reasons it has never been possible to convince Congress of the importance of this part of the work. Early in April, 1954, the Committee on Appropriations of the House reported its recommendations for 1954. In effect these will eliminate all salvage archaeology outside the Missouri Basin. This means the complete loss of excavations in reservoirs in Missouri, Arkansas, California, Washington, and Oregon. Surveys in Kentucky, Tennessee, and Texas cannot be made and the publication of a report on the Lind Coulee will be impossible. In addition, National Park Service excavations in four of its National Monuments will be abandoned as will surveys in Yosemite National Park and Death Valley National Monument. The projected publication of the work at Fort Vancouver will have to be postponed.

The situation is similar in the Missouri Basin. Estimates of funds required have been based solidly upon known needs and tied directly to construction schedules provided with absolute deadlines for flooding. The program cannot be cut without loss of vitally important archaeological sites; yet the program has been progressively curtailed from $222,030 in fiscal year 1951 to $95,000 in fiscal year 1954. This diminishing program has already resulted in the loss, through September, 1953, of 13 sites recommended for excavation in the Fort Randall reservoir alone. During the summer of 1954 other sites in both Fort Randall and Garrison reservoirs will go under water without adequate investigation.

It is probable that some adjustments will shortly be made so that the situation will not be quite as bad as it appears at the moment. However present rulings and inferred policies of the federal government will inevitably result in very serious curtailment of the salvage work. There is even the possibility that the work will be stopped altogether. Such an event would be disastrous now and such would be compounded in the future. In the face of this prospect we note that flooding of reservoir area continues; dams are being completed; new construction authorized; additional reservoirs proposed and planned. Unless a way can be found in which to increase the salvage work a wealth of essential information will be lost. The committee is considering the problem but it has no recommendations to make at present.

It is certain that until such time as financial support from the government can be increased it is necessary to seek such support from other sources. The amount of money necessary is, of course, large because of the emergency nature of the program. However, various possibilities are being discussed and we may hope that

some funds may be forthcoming. The private financing of the salvage work will probably make some difference in the manner of administration. It is to be hoped that the present organization may be held intact for it runs smoothly and efficiently.

Another development is of some significance. The National Park Service through liaison with the Federal Power Commission is following a line which may lead to negotiations with private power companies for the purpose of salvaging archaeological values in the reservoirs they construct. The Committee is collaborating in this. The precedents established notably by the El Paso Natural Gas Company and by other private companies are significant. Also directives inserted in at least one license by the Federal Power Commission are of interest. At the moment it is not known just how far the negotiations will go.

These remarks point up an opinion that the Inter-Agency Archaeological Salvage Program is facing an emergency which differs from the chronic ones which have beset it periodically since it was first organized. There is some reason for suspecting that the salvage work will continue and, we hope, expand to a point where it will be of even greater value. However, it is not impossible that the nature of the administration of the work may be modified. The problems faced cannot be solved as they have been in the past. Nevertheless once a means leading to a solution can be found the government agencies, the committee, and all others concerned will need the unqualified and energetic support of the members of the Society for American Archaeology.

There is one direct recommendation which the Committee can make at this time. There are hundreds of sites which must be excavated. These can be worked on singly or in groups; in other words, any kind of a valid useful and urgent archaeological project can be drawn up. Actually, in the eyes of nonarchaeological observers there is reason for questioning why more such projects by museums and universities have not been set in motion. However this may be, it is to the best interest of American Archaeology for organizations to reorient their work in North America as rapidly as possible so that an increasing amount of excavation will be done in proposed reservoir areas. The need for the work is vital and the results will be of great significance.

FREDERICK JOHNSON, *Secretary*
Committee for the Recovery of
Archaeological Remains

Herewith are listed, pursuant to the requirements of the By-Laws, Article II, Section 2, the names and addresses of the Nominating Committee for 1954-1955: George W. Brainerd (Chairman), Southwest Museum, Highland Park, Los Angeles 42, California; E. Mott Davis, Department of Anthropology, University of Nebraska, Lincoln 8, Nebraska; Dorothy L. Keur, Department of Anthropology, Hunter College, Bedford Park Blvd., W., New York 68, New York. The offices to be filled in the 1955 election are President, First Vice-President, Second Vice-President, and two Executive Committee Members. Members are reminded that they may suggest names for nomination to the Nominating Committee before December 1, 1954.

NOTES AND NEWS

PACIFIC COAST

Charles Borden of the University of British Columbia indicates that his plans for summer research had to be altered to accommodate salvage excavations at the Tsimshian village site near Terrace, B.C., which was to be destroyed by road construction. This work was to be followed by a survey between Fraser Lake and Vanderhoof in central British Columbia, and later, a survey of the Kootenay River area which would be flooded by construction of the proposed Libby Dam. If sufficient time remained at the end of the summer, Borden planned to begin excavations in the old habitation area on the Musqueam Reserve.

A 6-man University of Oregon crew under the direction of Luther Cressman continued excavations at Five Mile Locks, east of The Dalles, in The Dalles Reservoir area. The work was concerned with the excavation of a portion of the site having an artifact-bearing hardpan bed separating occupation layers. Following the work at The Dalles, Cressman planned to excavate at the mouth of the Deschutes River.

Richard Daugherty of the State College of Washington conducted a 10-week archaeological survey of the Peace River, west of Fort St. John, British Columbia, during the summer. The valley of the upper Peace River forms one of the principal passes connecting the Interior Plateaus of Canada physiographic province with the Great Plains, and is therefore of considerable interest in terms of early as well as recent population movements.

Carling Malouf reports the completion of several research projects which were carried out under his direction by student crews from Montana State University. A site was discovered in the upper Bitterroot River valley, an area formerly occupied by Flathead Indians, which yielded a number of projectile points, a pestle, and some knives. These implements were recovered from Horizon II, a period preceding the historic period. Early protohistoric material was also recovered from the site, including such prominent Plains traits as mauls and corner-tanged knives.

A large occupation site, from which abundant surface material was obtained, was discovered east of Deer Lodge, Montana, on a tributary of the Clark Fork River.

Two caves, located on the headwaters of the south fork of the Dearborn River, were tested by Malouf and student assistants. Neither cave yielded artifacts, but one, located at an elevation of 7,000 feet, exhibited a number of pictographs on the walls. Chips and an occasional worked specimen were found in the valley below.

A burial of a female and an infant was located on the campus of Montana State University during excavation for a parking lot. Hundreds of glass beads, a shell gorget, rings of brass wire, buttons and bells accompanied the burial. This, the third such burial found on the campus in recent years, was excavated by Malouf's archaeology class.

At the Department of Anthropology, University of Utah, J. D. Jennings is working on a survey of the present knowledge of Plains archaeology for the National Park Service. The objectives of this program are to gather and evaluate the published reports and unpublished manuscripts, field notes, and collections from the Plains area in order to assess the present state of knowledge and to aid in the organization of a program for future research. The report will be utilized in a recreational study of the Missouri River Basin.

Jack R. Rudy resigned as field director of the Utah Statewide Archaeological Survey in July. He has been working for the National Park Service during the past summer. James Gunnerson, who is completing his Ph.D. degree at Harvard, has assumed the position as field director of the Survey, and has begun a survey of northeastern Utah and the Uinta Basin.

John Buettner-Janusch, departmental instructor at the University of Utah, is completing a study of the skeletal material from Deadman Cave. The cave, located on the southwest shore of Great Salt Lake, was excavated between the years 1938 and 1941 by E. R. Smith. Buettner-Janusch is also continuing his research in the use of infrared film for photographic work in archaeological excavations.

Two more reports to be published in the *University of Utah Anthropological Papers* series have been completed and are now in press. The first report covers the excavations of two puebloid house sites near Baker, Nevada, carried out in 1952 by Dee C. Taylor. The other paper is a report on the 1951 excavation of Pine Park Shelter near Enterprise, Utah, by Jack R. Rudy. These two reports are to be ready for release sometime this fall.

William J. Wallace reports that a University of Southern California class in archaeological field techniques excavated a campsite on the E. B. Gilmore Ranch in Little Sycamore Canyon, Ventura County. The meager artifact content of the deposit suggests a seasonal occupation of the site. Artifacts included mortars and pestles, large projectile points, stone pendants, and olivella shell beads. The scarcity of animal bone suggests a major dependence upon plant and shellfish gathering. This is the fourth site excavated in the intensive program of archaeological research in Little Sycamore Canyon. Work will begin at a fifth site in the fall.

William J. and Edith T. Wallace planned to conduct excavation at a large camp or village site in Vermillion Valley in June. The site, located in the High Sierras (elevation 7,800 feet), is situated in a reservoir area scheduled for flooding in 1955. Preliminary excavations in 1953 indicated a rich cultural deposit. The work will be carried on with the cooperation of the Southern California Edison Company.

Mark R. Harrington, Curator of the Southwest Museum, recently received a radiocarbon report on charcoal

from the Tule Springs site in southern Nevada. Dr. Libby reported that he could get no reaction from the charcoal, implying an age of 23,800 years or more. Libby requested more material for a recheck. The site was discovered in 1932 by Fenley Hunter, working for the American Museum of Natural History, and was briefly described as "A Camel-Hunter's Camp in Nevada" (*The Masterkey*, Vol. 8, No. 1, 1934, pp. 22-24). Hunter discovered a deeply buried deposit of charcoal containing one large used flake of obsidian and many bones of extinct camel, horse, and bison. Later, the Southwest Museum was invited to examine the site, and many additional bones, some worked, others split and burned, were found in the charcoal and ash level. Possibly washed from the deposits were a few large stone scrapers and choppers.

Recent staff changes at the Southwest Museum have been the resignation of Mr. Edwin F. Walker, due to ill health, and the appointment of Mrs. Bernice E. Johnston as Docent.

Archaeologist Louis R. Caywood of the National Park Service reports that under a cooperative agreement with the University of Washington, work was continued in The Dalles Reservoir project on the Washington side of the Columbia River under the direction of Warren Caldwell. Cressman's work on the Oregon side of the river was also carried out in cooperation with the National Park Service.

In California, work has been done under the Inter-Agency Archaeological Salvage Program at the Monticello Reservoir project north of San Francisco by cooperative agreement with the University of California. Adan Treganza has been in direct supervision of the work under the direction of Robert Heizer. Also carried out by cooperative agreement with the University of California was the archaeological research in Yosemite National Park.

Under a cooperative agreement with the National Park Service, the University of Southern California has been working in Death Valley National Monument.

Caywood also reports a brief, emergency archaeological survey of areas to be disturbed by construction in Yosemite National Park. Except for one Mono burial he found no archaeological evidence worthy of extending the work.

The final report of the excavations of the historical site of Fort Vancouver, Vancouver, Washington, is being completed by Caywood. Excavations at this site were carried out under Caywood's direction in 1950 and 1952.

SOUTHWEST

Arizona. Edward B. Danson, University of Arizona, Tucson, was acting director of the University's Archaeological Field School at Point of Pines, assisted by Raymond H. Thompson of the University of Kentucky. Fifteen students from 5 institutions make up the enrollment for the ninth season of excavation.

Charles Di Peso and Barton Wright, Field Foreman, Amerind Foundation, Dragoon, will continue their field project at old San Cayetano del Tumacacori, where they are finding historical contact material in late Hohokam compounds, and an earlier village on the same hill, dating back roughly to the 700's. The Amerind Foundation is also in the process of building a new storage wing. Gwyneth Harrington is the new secretary and librarian at the Amerind.

Odd Halseth, Pueblo Grande, continues the excavation of about 6 acres which will be used as an outdoor museum upon completion.

Robert Euler of the Museum of Northern Arizona, undertook a salvage excavation on an El Paso Natural Gas Company pipe line right-of-way several miles southwest of Ganado. Two intensive surveys were also started. One of these encompassed the Houserock Valley-Vermillion Cliffs region north of the Colorado River. The other covered the upper drainage of Navajo Canyon in the general vicinity of Inscription House Ruin.

New Mexico. In the National Park Service headquarters for the Southwest Region at Santa Fe, A. H. Schroeder completed during the spring his Yavapai study for the Justice Department; Charlie Steen has been working on a full report of his 1949-50 excavations at Tse-taa in Canyon de Chelly; and Erik Reed has worked on human skeletal material from several sites. No new archaeological field work by Service personnel was scheduled for the summer in National Park Service areas in the Southwest, because of reduction of funds for this purpose as well as for the River Basin Salvage program. In the Southwestern National Monuments group, with headquarters at Globe, Arizona, Gordon Vivian is carrying forward the continuing program of ruins stabilization and also completing archaeological reports on previous work at Chaco Canyon and elsewhere. At the new Archaeological Preservation Laboratory, also at Globe, John M. Turney is processing collected materials brought in, primarily from the Southwestern National Monuments area.

At El Morro National Monument, excavation in a Pueblo IV site, the large mesa-top ruin, was carried out by a Columbia University party under the direction of Richard B. Woodbury and Nathalie F. S. Woodbury, accompanied by two Columbia graduate students, Timothy J. O'Leary and Charles W. Ward. The National Park Service will stabilize the portions of the ruin excavated to provide a permanent addition to the exhibition program at the Monument.

Fred Wendorf, Museum of New Mexico, Santa Fe, reports that he and Jess Nusbaum have had a conference with C. O. Erwin, New Mexico State Highway Engineer, and W. J. Keller, Chief of the New Mexico District of the Bureau of Public Roads, which resulted in an agreement whereby the construction agency (either the Bureau of Public Roads or the New Mexico Highway Department) will supply the manpower and the Museum of New Mexico supervision for all sites threatened with

destruction by new road construction or improvement projects. To date 6 sites have been or are being worked on. Wendorf hopes that other institutions will assist the museum in this salvage project.

Paul Martin advises that their new report on the work of the Higgins Flat Pueblo has kept John Rinaldo, Elaine Bluhm and himself busy during the winter and is now in print. Rinaldo also worked on a manuscript dealing with detailed descriptions of Mogollon pottery types of the Reserve area. Martin and Rinaldo's report on the "Caves of the Reserve Area" (1952 season) has just been released. During the season of 1954 excavations were made in a rectangular kiva at Higgins Flat Pueblo, and in one of the latest sites in the area.

Stanley Stubbs, Laboratory of Anthropology, Museum of New Mexico, Santa Fe, reports that "The Excavation of Pindi Pueblo, New Mexico," by Stubbs and Stallings has come off the press.

The University of New Mexico conducted its summer field session under the direction of Frank C. Hibben at the Pottery Mound site on the Puerco of the East, south of Albuquerque.

COLORADO. Robert Lister, University of Colorado, Boulder, returned from Mexico at the beginning of the summer. He directed the University of Colorado's field session at Mesa Verde, with 16 students enrolled.

PLAINS

The archaeological salvage program of the Smithsonian Institution, National Park Service, and cooperating institutions was continued in the Garrison and Jamestown reservoirs in North Dakota and in the Oahe and Fort Randall reservoirs in South Dakota. Throughout the Oahe Reservoir and in the upper reaches of the Fort Randall Reservoir hundreds of sites await investigation. In the Garrison Reservoir and in the lower portion of Fort Randall most of the sites previously located by the survey parties have been inundated. Some of these sites have been excavated. Others required excavation but funds and time were not sufficient to keep them from being lost.

At site 32ML2 in Garrison Reservoir G. Hubert Smith of the Smithsonian Institution and Alan Woolworth of the State Historical Society of North Dakota worked on the remains of the aboriginal settlement known as Like-a-Fishhook Village, the hitherto undiscovered trading post called Fort Berthold 1, and the remains of the military establishment designated as Fort Berthold 2. The work of Woolworth was made possible through a cooperative agreement with the National Park Service. With the water steadily rising at the edge of the terrace, large areas were stripped with the aid of a road scraper and a bulldozer. The features revealed were then excavated with hand tools. Complete inundation of the site was scheduled for mid-July.

The location of Fort Berthold 1 has been positively identified for the first time. It can now be demonstrated that Mathews was wrong in assuming that it had been washed into the river. Instead the location of the fort had been obscured by Arikara earthlodges and log cabins that were built over it after the Dakota had burned it in 1862.

In the Jamestown Reservoir on the James River, Richard Wheeler returned to the Hintz site with a Smithsonian party to determine the extent of the occupation. The site proved to be a small earthlodge village containing pottery similar to that found in historic Mandan villages along the Missouri River to the west. The maximum extent of the village was determined and excavations were terminated in June. This completes the necessary minimum of archaeological salvage work in the Jamestown Reservoir unless additional sites are revealed by wave action after the lake reaches normal pool.

In Oahe Reservoir Wesley R. Hurt, under a cooperative agreement with the National Park Service, began the excavation of the Swan Creek site for the University of South Dakota and the State Archaeological Commission. The site is a large earthlodge village with refuse deposits several feet in depth. Preliminary studies of the pottery indicate close affinities with that found by Wm. Duncan Strong at the Rygh site in 1932.

In Fort Randall Reservoir Paul Cooper led a Smithsonian party in the intensive testing of several sites subject to immediate destruction in the area near Chamberlain, South Dakota. In most instances the work has involved the excavation of an earthlodge and trenches to locate other features in each of the sites.

At the Crow Creek site, also in Fort Randall Reservoir, Marvin Kivett, under a cooperative agreement with the National Park Service, began the excavation of houses, fortifications, cache pits, and refuse deposits for the Nebraska State Historical Society. Assistance was rendered by E. Mott Davis and the field school of the Department of Anthropology, University of Nebraska. The pottery at the site displays relationships with the Chamberlain and Aksarben aspects.

At the Oldham site, farther south in Fort Randall Reservoir, Harold Huscher continued excavations for the Smithsonian Institution ahead of the steadily advancing waters of the lake. He was principally concerned with the delineation of the stockades and with a search for stratigraphy. The work of this season was directed largely toward isolating and separating the features and artifacts pertaining to two components and toward determining whether or not a third component is present.

On a visit to the Talking Crow site in Fort Randall Reservoir, Carlyle S. Smith was surprised to see a graded gravel road, 85 feet in width, going straight through the middle of the site. House pits and other features were observed in profile for a distance of over 1200 feet.

At the River Basin Surveys National Park Service field office in Austin, Texas, Edward B. Jelks has been working on completion of reports on previous excavations and therefore made only a few minor additional field surveys. In the general reduction of the Service's River

Basin Salvage program, the Austin office (at the University of Texas) is being closed down completely in the fall of 1954.

NORTHEAST

The New York State Science Service and State Museum had a party in the field from mid-June to early September. William A. Ritchie, assisted by William R. Young and Walter F. Knowlson, concentrated major efforts on a reconnaissance of a portion of the St. Lawrence Valley between Massena and Ogdensburg, N.Y., which will be inundated by the construction of the St. Lawrence Seaway. The initial survey included Long Sault and Barnhardt's Islands where work has already begun by the State of New York on hydroelectric dams. Some time was also spent investigating Archaic and Early Woodland period sites in eastern and western New York.

Ritchie has completed a monograph on his investigations in 1951-52 of two Early Woodland period burial sites on the Indian River, Jefferson Co., N.Y. It is called "Recent Discoveries Suggesting an Early Woodland Burial Cult in the Northeast." His report, "Dutch Hollow, an Early Historic Period Seneca Site in Livingston County, New York," appeared in June as *Research Records* Number 10 (Rochester Museum of Arts and Sciences) and also in the *Researches and Transactions of the New York State Archeological Association*, Volume XIII, Number 1.

A party from the University of Toronto spent the summer conducting an archaeological survey in the St. Lawrence River Valley in Canada paying particular attention to the area to be inundated by the St. Lawrence Seaway.

Thomas Lee, National Museum of Canada, with a small party spent the summer at Sheguiandah in what he expected was the last season to be devoted to the excavation of this important site on Manitoulin Island.

The Hummel Site, Ontario County, New York, was investigated by members of the Lewis H. Morgan Chapter, New York State Archaeological Association. A week end of testing various parts of the site revealed that the depth of deposit was shallow. Much of the artifactual material recovered has been placed in the care of the Rochester Museum of Arts and Sciences. Alfred K. Guthe has continued examination of this site which was heralded as transitional between Owasco and Iroquois cultures. Pottery exhibits Iroquois designs rendered in a cord-wrapped stick technique. Other than pottery, mortars, bone awls, danglers made from deer phalangeal bones, and pipes of the trumpet type have been found. Some post molds have been located, but as yet, no definite pattern can be determined.

William J. Mayer-Oakes reported that the Carnegie Museum's Upper Ohio Valley Archeological Survey spent the first part of the 1954 season conducting "stratacut" excavations at 10 sites. Seven of these are in the Ohio valley, one in the Monongahela valley, and 2 in the Allegheny valley. It was hoped that additional evidence for the chronological framework which has been emerging for the area in the work of the past years would be obtained, since each site promised to produce a greater than average depth of deposit. It was expected that substantiation and amplification of the pottery type and ware seriation studies recently completed for the Upper Ohio Valley would result.

Later in the season, the UOVAS party directed its attention to sites in the Monongahela drainage. Particular interest lay in the two facets of the rather complicated Late Prehistoric period: 1) the nature and content of its beginning; 2) the nature and content of its ending; i.e., the Historic Monongahela culture which is apparently the final florescence of the typical Late Prehistoric Monongahela culture.

Mayer-Oakes also stated that he expects the Survey report to be out early this fall.

SOUTHEAST

Georgia. Dr. F. W. Libby has announced a C-14 date of 150 B.C. for a sample from a line of postholes near the base of the old natural levee, site 9 HL 64 in the Buford Basin. Associated ceramic material is largely Cartersville Check Stamp with minor amounts of Mulberry Creek Plain and Wright Check Stamp. Simple Stamped begins in the upper part of the levee. The sample then dates with some accuracy early check stamping in Georgia and offers a fair check with Adena Mounds in which minor amounts of check stamped and simple stamped pottery occur. C. Fairbanks has prepared a report on his excavations at the site which now awaits publication. It will supplement J. Caldwell's original report on the site. (The Booger Bottom Mound: A Forsyth Period Site in Hall County, Georgia. *American Antiquity*, Vol. 17, No. 4.)

Final work is now underway on Mound C at Ocmulgee National Monument with the removal of the badly decayed shelter and stabilization of the mound as a field exhibit. Stabilization is a National Park Service-Ocmulgee Auxiliary Corporation enterprise. It is hoped that the necessary excavation will reveal structure patterns, not recorded in the original excavation. A report on the original excavations has been prepared by C. Fairbanks and is now in press as No. 3, National Park Service Archaeological Series.

Charles H. Fairbanks has begun the analysis of the collections from the Trading Post area at Ocmulgee National Monument. Collections from historic Creek levels include a strong minority of trade ware about equally divided between Spanish Majolica and salt glazed stone ware which is presumably of English origin. A few scrapers chipped from common green English glass have been noticed.

A. R. Kelly has been at the Monument this spring writing a report on the excavations initiated in 1934 at Mound D. During July and August he conducted a summer field school in archaeology at Etowah and New Echota.

Lewis Larson has completed the field work on the Georgia Coast survey, aimed at problems of the Spanish Mission period, which he conducted for the Georgia Historical Commission. A large part of the winter was spent in excavation of a small mound of the late pre-contact period which produced a large amount of skeletal material. The collections, resulting from approximately 12 months of survey and excavation, are stored at the University of Georgia. A report is to be prepared by Larson.

Larson was transferred in March to the New Echota site, late Cherokee capitol town, by the Georgia Historical Commission, sponsor of the excavation, and was then transferred to Etowah early in May. Work at New Echota proceeded under the supervision of Joseph Caldwell during May, since then under Clemens De Baillou, former professor of German at the University of Georgia. One unit excavated is believed to represent McCoy's tavern, another that of the print shop of Elias Boudinot, editor of the *Cherokee Phoenix*. Over two hundred pieces of type used in the Cherokee newspaper have been found.

C. H. Fairbanks has examined the historic ceramics, and states that: "The collection consisted largely of semiporcelains of the 1820 period. A mark of the Davenport pottery was identified as well as Enoch Wood and Sons, Burslem, on a blue featheredge plate. Both of these potteries were English factories operating during the early 19th century. . . . Apparently the Cherokee in the capitol town made almost no native pottery during the decade preceding removal to Oklahoma."

Re-excavation of Mound C at Etowah has revealed that the standing mound stub, some 12 feet high, had not been disturbed by Moorehead except for occasional pits and postholes. Burials, many of them in stone slab graves, number over 20 to date in one relatively small cut into the face of the mound toward the plaza. Among the exceptional specimens found thus far are a "sun disc" of polished stone and two more of the stone figurines for which Etowah is so well known. These two figures, about 24 inches high, are particularly unusual in that red, black, and white paint is rather well preserved on body, face, and head ornaments. Perhaps the most unusual feature is that they were found in a pit dug through the toe of the mound, apparently during the post-Etowah Wilbanks level. The two figures seem to have been thrown into the pit, the male figure head first, the female erect. Breakage was however confined to one arm of each specimen.

A model of the Spanish Mission period site at Darien, Georgia, excavated by Shiela Kelly Caldwell, has been prepared for exhibit.

Vincenzo Petrullo, visiting professor at the University of Alabama, is conducting archaeological survey and excavation at Rock Eagle Park, Eatonton, Georgia, with A. R. Kelly. The 4-H club center is sponsoring the survey with a view to development of a museum.

At the University of Georgia, Sears has completed the final report on Kolomoki. Available research time over the winter has been spent on analysis, now complete, of the collection of over 40,000 specimens excavated at the Etowah site last summer. All levels of Etowah development are represented, plus the following Wilbanks period and its probable derivative, early historic Cherokee. Also under way is further study of the collections from the historic Creek town of Kasita, excavated by Gordon Willey in the thirties. A joint report will be prepared.

LOUISIANA. A new State Park was dedicated at Marksville on March 7, with William G. Haag and Frank Setzler as the principal speakers. A museum building has been built with architectural motifs illustrating the Spanish and French influences which have left their marks in the Marksville environs. The first half of the exhibits, designed by James A. Ford and Floyd Lafayette of the Museums Division, National Park Service, were built and installed by the museums division. Robert Neitzel has been appointed curator. The museum is open the year around and welcomes visiting archaeologists.

MISSISSIPPI. The lower Mississippi Valley Survey has continued its work, concentrating mainly around Vicksburg. About 30 sites were added to the catalog. Extensive tests were made at two sites of Marksville-Troyville date by a graduate student, Robert Greengo, under the general supervision of Philip Phillips. Special aim of the work has been to gather as much material as possible from the Marksville-Troyville period for an attack on the problem of northern and southern relationships of the zoned rocker-stamp tradition.

ARKANSAS. Stephen Williams has been working at Harvard on the Hapson collections from Nodena with the intention of publishing a monograph on this most extensively excavated site. The project is jointly sponsored by Harvard University and the University of Michigan.

FLORIDA. John W. Griffin has joined the staff of the St. Augustine Historical Society as Executive Historian. The Society plans an intensified program of archaeological and historical research and interpretation.

TENNESSEE. T. M. N. Lewis and M. Kneberg assisted in direction and development of the Cherokee Museum and other projects again this past summer at Cherokee, N.C.

MIDDLE AMERICA

TAMAULIPAS. Richard MacNeish, assisted by P. Pratt, D. Kelley, and P. Grant, continued his survey. His most spectacular results came from Romero cave, in the Sierra Madre, which yielded 26 layers and 7 complexes or foci. Finds included approximately 4,000 corn cobs of various races, 20,000 fragments of maize, 7,000 of beans, 6,000 of squash, 100,000 of other vegetal remains, 500 of string or rope, 700 of mat, 1,000 projectile points,

300 scrapers, 200 wooden tools, shafts, etc., and 12 burials.

The 7 horizons are as follows: 1. Infiernillo: wild food stuffs, mats (checker and twill), leaf points and blades, and diamond-shaped points present. 2. Portales: squash, beans (perhaps cultivated), and atlatl shafts appear. This develops into 3. Guerra: early Bat Cave maize and, perhaps, gourds present. 4. Mesa de Guaje perhaps follows a break: a few grains of teocinte are present, and four maize cobs show hybridization with teocinte. This marks the first appearance of cotton cloth and pottery, the last being very like Ekholm's Panuco II (El Prisco). Two of 4 burials were wrapped in mats tied with rope. 5. Palmillas: arrowshafts, tobacco and chile present. Pottery is almost identical with du Solier's Buenavista material and very similar to Panuco IV (Zaquil). 6. San Lorenzo. All shafts are arrows. Leather bags and a leather sandal were found. 7. San Antonio: equivalent to Panuco VI, partly historical.

Mexican Plateau. At Tula, Jorge Acosta, with the aid of Rafael Orellana and Ponciano Salazar, all of the Instituto Nacional de Antropología e Historia, have worked principally on the great hall of the Palacio Quemado. They brought to light a bench with magnificent low relief sculpture still retaining its bright colors. The subject matter is a procession of chiefs with weapons and emblems of rank. The stairway and the 3 lower terraces of the pyramided construction called Mound C have been restored, as well as an altar of Aztec type northwest of Mound C.

At Teotihuacan, Agustin Villagra, also of I.N.A.H., is reconstructing the murals at the outlying Atetelco group, and the structures at Tetitla are being roofed to preserve the murals.

Work by Mr. and Mrs. William J. Mayer-Oakes marks the entrance of Carnegie Museum, Pittsburgh, into the Middle American field. They made a survey in the Valley of Mexico to locate sites with cord-marked or fabric-impressed pottery. From the 20 which yielded these wares, they chose El Risco, site of a rural community on what was once the shore of Lake Texcoco, for more intensive work. A cut exposed 12 feet of vertical deposit with Late Teotihuacan at the bottom and Aztec III at the top. The sherds were almost entirely utilitarian. Cord- and fabric-marked pottery rose from a very low percentage in the lowest level to the astonishingly high peak of 60-80 per cent in the upper half of the deposit. The classification of the material is not yet complete, and is rendered difficult by the lack of comparative information on strictly utilitarian wares in Central Mexico, but the Mayer-Oakes feel that the sequence indicates ceramic continuity for the whole occupation, evidence for a Toltec occupation, and data indicating the beginning, peak, and start of a decline in the two wares. Actually, there is some evidence, they note, of that type of decoration in the Formative period (Ticoman and Copilco). It is hoped that these data can be integrated with those collected by Paul Tolstoy, graduate student of Columbia, who is making a seriation study of pottery in the northern part of the Valley.

Oaxaca. As the result of a discussion at the 27th International Congress of Americanists, the beam and mortar roof of the columned hall at Mitla is now being rebuilt under the supervision of Carlos Margain, of I.N.A.H., following the evidence first noted by W. H. Holmes. This is one more instance of the deep interest of the Mexican government in preserving its heritage.

Ignacio Bernal, with a group of students from Mexico City College, began work at Yagul, a large site near Tlacolula, quite close to Mitla. The buildings resemble closely those of Mitla, and once carried the same type of mosaic decoration in geometric designs. Pottery includes very late and degenerate types suggesting occupation of the site until the Spanish conquest. There is a large ball court. The same group also excavated Tomb 172 at Monte Alban.

Maya Area. The most outstanding feature of the 1954 season of Carnegie Institution of Washington in Yucatan (Harry Pollock, Director) was the evidence collected by Edwin Shook and Robert Smith that there was no post-Toltec occupation of Chichen Itza except for that of pilgrims and campers. They trenched in and around buildings which were believed to be the latest at the site, because of resemblances to the architecture of Mayapan or because of the re-use of much Toltec sculptural stone. Among 25-30,000 sherds were none of the types of Fine Orange found at Mayapan and only 3 or 4 sherds of Mayapan red, diagnostic of the period of Mayapan domination. Two of those sherds were in the detritus of Edward H. Thompson's excavation of the High Priest's grave, already known to have been used for burials of the Mayapan period. They may have belonged to vessels from the burial shaft excavated by him (Mayapan red ware also occurs in the cenote collections). It now seems clear that there was no overlap between Toltec Chichen and Mayapan's domination. Indeed, Shook believes there may have been an interval between these periods. This is a serious blow to the 11.3.0.0.0 correlations. Late Mayapan incensarios were found above collapsed buildings.

At Mayapan, Howard Winters uncovered a badly damaged mural picturing several temples. The season's work extended in every way knowledge of the site's history, and produced a number of interesting complete vessels which cast light on religious practices, notably the discovery of brightly painted fragments of effigy incensarios which established the existence in Yucatan of a Xipe Totec cult, previously suspected but not proved. Arrowheads and copper bells were unearthed. Karl Ruppert and Ledyard Smith finished thier great project of mapping the house sites and associated structures (nearly 4,000) at Mayapan, and began a similar survey at Chichen Itza. Because of the small amount of debris accumulated at Mayapan, the ground plans can usually be made out with little or no excavation. At the close of the season the staff felt that a

much clearer picture had developed of Mayapan and its place in Maya history. It is now clear that the city was not occupied or occupation was minimal during the Toltec Chichen period. Restoration and conservation were carried out at Labna, Kabah, Uxmal, and Sayil by members of I.N.A.H. William T. Sanders, Fellow of Carnegie Institution of Washington, began a survey of northeastern Yucatan and the island of Cozumel. He believes that he has located the site of historic Conil.

Of the work in British Honduras Gordon Willey reports that with the assistance of W. R. Bullard and J. B. Glass he initiated what is hoped to be a long-term investigation by Peabody Museum, Harvard, into Classic Maya settlement patterns. They mapped the Barton River site, about 3 miles N. E. of Baking Pot, which occupies an area of about 700 acres. There is a small ceremonial group and clustered around it nearly 300 mounds, of which 235 were plotted. In general these are scattered at random about 50 m. apart over the alluvial plain. One mound, excavated in detail, revealed 26 burials, all late in the occupation which covered both early and late Classic. Stratigraphic pits in 12 similar mounds extended the occupation back to late Formative (Chicanel); nothing surely post-Classic was found. Bullard and A. C. Wright, of the Br. Honduras Land-Use Survey, examined a series of stone-faced artificial terraces in limestone hilly country. They appear to check with those described by Eric Thompson 25 years ago.

Michael Stewart, associate of the British Museum, cleared the whole ceremonial center of Benque Viejo (Xumantunich), and excavated in A Group. He also discovered a ceremonial unit, Cahal Xux, only 2 km. north of Benque Viejo. There are badly weathered carved stelae and a steep pyramid rivaling A6 at Benque. He also made important discoveries of walled agricultural terraces in the general vicinity of Caracol. These are similar to those noted above.

At Palenque, Alberto Ruz and Cesar Saenz of I.N.A.H., removed the supports built against the tomb in the pyramid of the Inscriptions, revealing a design of persons and stylized plants growing out of the earth, as well as glyphic inscriptions. The legs also reveal heads and glyphs. The 9 figures in stucco around the walls of the chamber were cleaned of lime accretions. Three of them are seated. Structures (Cross, Foliated Cross) were carefully examined to see if they also contained secret stairways, but with negative results. No tomb was found in the crypt room (long since known) of the Temple of the Belle relief.

Frans Blom has continued work at Moxviquil with financial support from "The Mayan Order" of San Antonio, Texas. Last season he was joined by C. W. Weiant, representing the Explorers Club. The outstanding feature of this quite small site, on top of a hill overlooking San Cristobal Las Casas, is the presence of an H-shape ball court. Blom reports sherds of Monte Alban II and III. This, if confirmed by Monte Alban ceramists, will represent the first such find in the Maya area. A burial yielded 2 human effigy vessels, mold-made, of a new type. The fine faces, in relief, are Maya in character. A multiple secondary burial in a stone-lined cyst revealed skulls segregated in a heap. Flint arrowheads and other material suggest an occupation continuing into late times. Indeed, remains of a chapel, identified by Blom as sixteenth century, lie between the main court and the ball court.

In the basin of the lower Usumacinta, Heinrich Berlin, Carnegie Fellow, continued his survey. Excavation of 6 sites revealed early Classic (at one site only), Polychrome quite similar to contemporary Peten, late Classic, and post-Classic. A sealed off deposit at Jonuta produced late Classic fine paste wares (probably Fine Orange) and many of the fine figurines of the region. At Juarez, near Cintla, were post-Classic deposits which may not long antedate the Spanish conquest. Figurines of crude workmanship included Atlantean figures and models of temples. Fine paste wares show almost no decoration. At Tamulte de las Sabanas copper bells were with this same complex.

Stephen Borhegyi reports 2 new archaeological sites in Guatemala, Chanteros, near Lake Ixpaco, Department of Santa Rosa, and La Campana, near Monjas, Department of Jalapa. A beautifully carved thin stone head, the "palangana" type of ball court, and the red-and-black-on-buff (Chinautla type) pottery indicate that Chanteros was occupied during the late Classic and post-Classic periods. La Campana, consisting of about 80 large mounds, yielded a number of "doughnut" stones, large red ware jars, and late Classic Copador polychrome sherds. A large tenoned stone head depicting a human head in a serpent jaw was found near the ball court in Group A.

Regional Journal. Since the check list was published (Vol 19, p. 210), a new journal, *Yan*, has been launched. This is sponsored by the new organization, Centro de Investigaciones Antropológicas de México. The subscription rate, $3.00 U. S. per volume, is payable to *Yan*, Apartado Postal 2242, Mexico, D. F. The volume consists of three quarto numbers on glossy paper (total, 200 pages). There are original articles, translations, and an emphasis on finely reproduced photographs. Usual features such as notes and news and reviews are included. Future numbers may be double Volume 1 which is now completed. This new journal, a fine publication, emerges as an indirect result of a disruption of *Tlatoani*. No number of the latter has appeared since the check list was prepared.

HIGHLAND SOUTH AMERICA

Peru. After the return of Disselhoff and Doering to Germany no major field work has been carried out. Louis Stumer returned to Lima in June and shortly will begin excavations in the Rimac Valley site of Vista Alegre under the auspices of the Museum of the American Indian.

The *Boletín de la Sociedad para la Antropología Peruana* appeared early in 1954. In this first number the results of the Lima Conference on Archaeological Terminology for Prehistoric Peru are fully reported. Copies were sent to interested Peruvianists, and their reactions to the suggested changes in nomenclature were solicited. On the basis of these reactions it is planned to convoke a new round table for the purpose of establishing a definitive terminology for Peru.

BOLIVIA. The Minister of Education of Bolivia, Sr. Federico Alvarez Plata has announced the organization of the Sociedad Arqueológica Boliviana which is composed of approximately 15 Bolivians who have been associated with archaeological studies in Tiahuanaco (e.g., Ponce, Sanjines, Cordero, Portugal, Díaz de Medina, and Pucher). He has invited Schaedel to act as coordinator to this society which will have the immediate task of developing a plan for the excavation and conservation of Tiahuanaco. The society is to begin work shortly. Scientific institutions interested in the opportunity to participate in this plan of excavations are cordially invited to present their proposal to the Minister of Education or to the Cultural Attaché of the American Embassy in La Paz.

CHILE. In January 1954 the University of Chile created the Centro de Estudios Antropológicos as a direct dependency of the Rectoría. This Centro supersedes the Sección de Antropología which functioned during 1953 as a dependency of the Facultad de Filosofía y Educación. Richard Schaedel, on an extension of a State Department grant as a visiting professor, was appointed as organizer of the Centro. The archaeological work, begun last June on the central coast between Algarrobo and Cartagena, was continued and new sites in the region of Valparaíso and Zapallar are being studied.

On February 1 a frozen body of a boy was found in a cairn of *pirca* on the summit of the mountain El Plomo by some muleteers. The find was reported to the Museo Nacional de Historia Natural early in February, but it was not until mid-March that, thanks to the intervention of personnel of the Centro de Estudios Antropológicos, the cadaver with its funerary offerings was purchased by the Museum. Both Schaedel and Dra. Mostny affirmed the authenticity of the burial as of the Inca period (possibly within the protohistoric). Despite this fact considerable skepticism as to the antiquity of the find was expressed both in Chile and outside, apparently because of the unusually good state of preservation of the body. On April 3 an expedition composed of mountain climbers of the Club Andino de Chile and Schaedel with 3 of his students left Santiago to examine the site of the find. Because of inclement weather the expedition was able to carry out only a limited examination of the site. The results of the expedition indicated that the body was buried under one of 3 cairns of pirca on the false summit of El Plomo (elevation, 5400 m.). These 3 cairns appeared to have been the tomb component of a ceremonial complex, the focus of which was a circular shrine, also of pirca construction, at the 5200 m. level. Other elements of the complex were a paved path of slabs leading to the shrine and a large triangular stone, resembling a crude *intihuatana*, which may have served as a marker. In a hearth immediately adjoining the shrine members of the expedition excavated some 35 cm. into the frozen ground where they found about 100 potsherds, most of which were clearly Incaic. The most common vessel form represented among the sherds was the shallow Inca plate. Fragments of the *aryballos* were also present. Other apparently secular pircas were noted in the vicinity of the shrine as well as in the vicinity of the base camp at the 3,200 m. level. Only one of this latter group could be investigated. It produced a sherd collection consisting of unidentified blackware mixed with Inca plates.

Luis Krahl, one of Chile's foremost mountain climbers, was the only member of the expedition to reach the summit. According to his report and photographs all 3 cairns had been disturbed. The area in which the cairns are located is, and has been since the time of the construction of the cairns, windswept to such a degree that no icecap, such as that occasioned by melting snow which was noted on the floor of the shrine, formed at the base of the cairns. The burial chamber consisted of a cylindrical hole of about a meter in depth. Given these conditions of interment, the excellent state of preservation of the body is understandable.

A complete study of the cadaver will probably be undertaken in the ensuing months by medical specialists of the Institute of Legal Medicine in Santiago. The clothing and other artifacts found with the cadaver are being studied by Dra. Mostny of the Museo Nacional de Historia Natural. The Centro de Estudios Antropológicos has investigated a number of other Inca sites in the vicinity of Santiago in an effort to place the ceremonial complex of El Plomo in its total context.

The Molle Culture. Jorge Iribarren reports his excavations of an important cemetery at a site called Turquía near Hurtado. The abundant material from the tombs includes circular plates of gold and silver, along with lip plugs, pipes, and pottery of the molle types. The varieties of pottery range from the typical molle blackware to painted and incised types similar to the condorhuasi style.

Isidoro Vásquez, student of the Centro de Estudios Antropológicos, spent several months in an extensive reconnaissance of Chiloé. He is preparing a report on archaeological sites of the island and on an interesting private collection of material from the West Coast.

ARGENTINA. Dr. Eduardo Casanova is continuing his work of reconstruction on the Pucará de Tilcara. Casanova and Lafon are working on a revised chronology for the Quebrada de Humahuaca. Menghin continues his important work on the preceramic cultures of Patagonia and immediately adjacent areas. Menghin and Rex Gonzalez have worked out a preceramic sequence for Cordoba and Catamarca which is reported in the

latest volume of *Runa* (1953). Rex Gonzalez is working on a Virú Valley type project for the western region of the Northwest Argentina area, selecting as his typical valley the Hualfín (Belén). He presented a fairly complete culture sequence for this valley at the Buenos Aires Conference. His work is based upon the systematically excavated Barreto Collection and field reconnaissance and excavation.

Mrs. Palavecino has undertaken a systematic survey and analysis of the techniques of prehistoric textiles of northwest Argentina.

Buenos Aires Conference. At the invitation of Rex Gonzalez and Casanova, Schaedel and Iribarren attended a conference on Northwestern Argentine Archaeology and its connections. The conference took place in the Museo Etnográfico in Buenos Aires and the Museo de la Plata (now Ciudad Eva Perón) between June 7th and 12th. The following themes were discussed: 1) application and significance of the terms culture, phase, facies, geographical areas and zones: 2) preceramic cultures; 3) delimitations of geographical zones in the northwest of Argentina; 4) chronology of the northern zone; 5) chronology of the western zone; 6) review of the eastern zone; 7) summary and results.

Highlights of the conference were a reformulation of Bennett's geographical divisions. The conference adapted his divisions of north (Septentrional), west (Occidental), and east (Oriental) with their corresponding subdivisions. The conference also decided the sociopolitical subdivision of the agricultural epoch, proposed for Peruvian prehistoric cultures, could not yet be applied effectively to the northwest Argentine, except for the empire stage. Casanova and Lafon considered Bennett's proposed cultural sequence for the north to be premature, insofar as it refers to the establishment of a Middle Period. Rex Gonzalez' sequence for the Hualfín replaces Bennett's for the central (Bennett) area. No cultural sequence could be offered for the eastern zone (Santiago del Estero) because no Argentine archaeologist feels himself competent to propose one on the basis of the current available data.

An official round-table conference was planned for July, 1955, to treat of the northwest Argentine and its relationships during prehistory to other south Andean cultures. The plan includes invitations to Bolivian, Chilean, Peruvian, North American and European specialists in the area.

LOWLAND SOUTH AMERICA

BRAZIL. Three sites at the headwaters of the Rio Xingú were investigated by Sr. Mario Ferreira Simões in 1952 under the auspices of the Museu Nacional. Stratigraphic excavations produced pottery that is different in technique and decoration from that made by the modern inhabitants of the area. Detailed analysis of this material is being postponed until more extensive excavations are completed this year.

A new museum devoted to ethnographical and archaeological materials has been established in the Federal Territory of Amapá. Mr. Peter Paul Hilbert, formerly on the staff of the Museu Goeldi in Belem, has been appointed director. In this capacity, he is doing archaeological survey in hitherto unexplored parts of the Territory, as well as revisiting regions investigated by others. A recent trip to the Rio Gurijuba and the Rio Macaquari (the first two rivers south of the Rio Araguarí) produced 3 sites, all on the latter river and all on the first high land west of the coastal swamp. All produced burial urns, some containing cremated remains. One site (Carmo) is characterized by sherd tempered pottery identified as Serra Plain of the Aristé Phase (*American Antiquity*, Vol. 16, p. 8). The others (São Jose and Assenção) produced a cariapé tempered ware. Hilbert interprets these as habitation areas that were also used for burial. During May he investigated caves in the Oiapoque region and sites on the Rio Cassipore. In July he plans to revisit sites on the Rio Maracá that were first described by Ferreira Penna in the latter part of the 19th century.

GENERAL

New World Antiquity began publication in January, 1954, and we are glad to welcome it to the growing number of periodicals reporting on archaeological affairs. *New World Antiquity* is a mimeographed news bulletin, which gives about 5,000 words monthly of information on current work and publications in the Americanist field. It also contains short articles of special interest. The purpose of the publication, which grew out of discussions at the 30th International Congress of Americanists, is to exchange information of work in progress or recently completed by scholars and students on both sides of the Atlantic. It is hoped that this will help to reduce duplication of effort, and also will afford a means by which international pooling of ideas on specific problems will be possible. The subscription rate, $3.00 for 12 issues, is payable to "New World Antiquity," Markham House Press, 31 Kings Road, London S.W.3, England. The editor, Miss Susan Lester, will welcome news items about current activities. They should be kept as short as possible, and typewritten. They may be in English, Spanish, French, German, or Portuguese, and should be sent to Miss Susan Lester, c/o Markham House Press.

The first issue of a new journal, *The Plains Anthropologist*, was printed at Lincoln in May. The journal is designed as a successor, in more permanent form, to the *Plains Archaeological Conference News Letter*. Material for publication, books for review, and subscriptions ($2.00 per year) should be addressed to the editor, Franklin Fenenga, Department of Anthropology, University of Nebraska, Lincoln, Nebraska.

MEMOIRS OF THE SOCIETY FOR AMERICAN ARCHAEOLOGY

Numbers 1-5, 8 and 9, are bound and sold separately.

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INFORMATION FOR AUTHORS

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1938. The Sauk Valley Skeleton. *Bulletin of the Texas Archaeological and Paleontological Society,* Vol. 10, pp. 136-68. Abilene.

Citations from separate books or pamphlets:

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1936. *Pleistocene Man in Minnesota.* Minneapolis: University of Minnesota Press.

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